Ont
L

Ontario Legislative Assembly

SESSIONAL PAPERS.

VOL. XXIV—PART III.

SECOND SESSION OF SEVENTH LEGISLATURE

OF THE

PROVINCE OF ONTARIO.

23975

SESSION 1892.

TORONTO:
PRINTED FOR LUD. K. CAMERON, QUEEN'S PRINTER,
BY WARWICK & SONS, 68 AND 70 FRONT STREET WEST.
1892.

23945
3/8/92.

LIST OF SESSIONAL PAPERS.

ARRANGED ALPHABETICALLY.

TITLE.	No.	REMARKS.
Accounts, Public	21	*Printed.*
Agricultural and Arts, Report	12	"
Agricultural College, Report	16	"
Agricultural Societies, Analysis	66	*Not printed.*
Albert Victor, Prince, Despatch	74	*Printed.*
Algoma East, Sales in	90	"
Asylums, Religious services in	87	*Not printed.*
Asylums, Report	7	*Printed.*
Bell, Judge, commutation	19	*Not printed.*
Benson, Judge, commutation	41	"
Births, Marriages and Deaths, Report	10	*Printed.*
Blind Institute, Report	4	"
Bonds and Securities	96	*Not printed.*
Borron's Report	3	*Printed.*
Business Tax	73	*Not printed.*
Canadian Institute, Report	17	*Printed.*
Children arrested	69	*Not printed.*
Clarence, Duke of, Despatch	74	*Printed.*
Courts, Fusion of	80	"
Crown Lands, Report	20	"
Dairymen's Association, Report	24	*Printed.*
Davis, Judge, commutation	38	*Not printed.*
Deaf and Dumb Institute Report	5	*Printed.*
Division Courts, Report	28	"
Dulmage, A. F., correspondence	98	*Not printed.*
Dundas and Waterloo Macadamized Road	85	*Printed.*
Dutton High School, correspondence	35	*Not printed.*
Education, Report	11	*Printed.*
" Dutton School, correspondence	35	*Not printed.*
" Napanee High School	44	"
" Sarnia High School	45	"
" Retirement of Professors	46	*Printed.*
" Retirement of Officials	47	"
" Industrial School Association	48	"
" Watford High School	50	*Not printed.*
" Publication of Arithmetic	51	"
" Publication of Writing Course	52	"
" Hagersville High School	53	"
" Publication of English History	54	"

TITLE.	No.	REMARKS.
Education, Text Book Regulations	55	*Printed.*
" Publication, Drawing Course	56	*Not printed.*
" Upper Canada College Retirement	57	*Printed.*
" Report on University Extension	58	"
" Pupils attending Collegiate Institutes	78	*Not printed.*
Election Returns, Bye	70	*Printed.*
Elgin House of Industry, Report	62	*Not printed.*
Entomological Society, Report	15	*Printed.*
Estimates	22	"
Experimental Union, Report (part of)	16	"
Factories Report	25	*Printed.*
Fish and Game Commission, Report	79	"
Fish and Game Commission, expenses	37	*Not printed.*
Forest Reservation in Nipissing	81	"
Fruit Growers' Association, Report	18	*Printed.*
Game and Fish Commission, Report	79	*Printed.*
Game and Fish Commission, expenses	37	*Not printed.*
Gaols, Report	8	*Printed.*
Gaols, indigent persons in	91	"
Hastings County, Debentures	49	*Not printed.*
Health, Report	26	*Printed.*
Hospitals, Report	9	"
Houses of Refuge, Report	6	"
Immigration, Report	29	*Printed.*
Indigent persons in gaols	91	"
Insurance, Report	2	"
Judicature Act, commutation	38	*Not printed.*
Judicature Act, commutation	39	"
Judicature Act, commutation	40	"
Judicature Act, commutation	41	"
Judicature Act, commutation	42	"
Judicature Act, commutation	43	"
Judicature Act, commutation	19	"
Judicature Act, commutation	67	"
Joint Stock Companies, incorporation	94	"
Ketchum, Judge, commutation	42	*Not printed.*
Ketchum, Judge, commutation	43	"
Legal Offices, Report	27	*Printed.*
Legislature, opening of	71	"
Liquor License fees	34	"
Local option	82	"
Macdonald, Judge, commutation	39	*Not printed.*
Magdalen Asylums, Report	6	*Printed.*
Martin, Clara Brett	75	"
Medical Students, Education of	68	"
Medical Students, Education of	92	"

TITLE.	No.	REMARKS.
Mines Bureau, Report	88	*Printed.*
Mining lands, withdrawal of	83	*Not printed.*
Morson, Judge, commutation	67	"
Muir, Judge, commutation	40	"
Municipal Indebtedness	99	"
North Perth Election	64	*Not printed.*
Nottawasaga River	60	"
Orphan Asylums, Report	6	*Printed.*
Prison Reform	36	*Not printed.*
Prisons, Report	8	*Printed.*
Proton Commission	89	"
Public Accounts	21	"
Public Works, Report	23	"
Queen Victoria Niagara Falls Park, Report	30	*Printed.*
Reformatories, Report	8	*Printed.*
Refuge, Houses of, Report	6	"
Registrars' Fees	86	"
Registrars' Office, Toronto	65	*Not printed.*
Religious services in Asylums	87	"
Secretary and Registrar, Report	95	*Printed.*
Severn River	61	*Not printed.*
Statutes, Revised	32	"
Statutes, Sessional	33	"
Tavern and Shop Licenses, Report	14	*Printed.*
Timber Berths on North Shore	97	*Not printed.*
Timber sold in unlicensed territory	84	*Printed.*
Titles, Report of Master of	72	"
Toronto General Trusts' Company	63	"
Toronto Registry Offices	65	*Not printed.*
Toronto University, Bursar's Statement	31	*Printed.*
Toronto University, Finance Report	13	"
Toronto University, Retirement of Professors	46	"
Toronto University, Retirement of Officers	47	"
Toronto University, Medical Students Education	68	"
Toronto University, Medical Students Education	92	"
Toronto University, German teacher in	77	*Not printed.*
University Extension, Report	58	*Printed.*
Upper Canada College, Bursars' Statement	1	"
Upper Canada College, Retirement Fund	57	"
Upper Canada College, Report on Site	59	"
Upper Canada College, Orders in Council, *re* Site	76	"
Upper Canada College, Correspondence *re* Site	93	"

LIST OF SESSIONAL PAPERS.

Arranged in Numerical Order, with their Titles at full length ; the Dates when Ordered and when Presented to the Legislature ; the name of the Member who moved for the same, and whether Ordered to be Printed or not.

CONTENTS OF PART I.

No. 1.. Statement of the Bursar of Upper Canada College for the year ending 30th June, 1891. Presented to the Legislature, 16th February, 1892. (*Printed.*)

No. 2.. Report of the Inspector of Insurance for the year 1891. Presented to the Legislature, 16th February, 1892. (*Printed.*)

No. 3.. Report of E. B. Borron on the Lakes and Rivers, Water and Water Powers of the Province of Ontario. Presented to the Legislature, 16th February, 1892. (*Printed.*)

No. 4.. Report upon the Ontario Institution for the education and instruction of the Blind, Brantford, for the year ending 30th September, 1891. Presented to the Legislature 16th February, 1892. (*Printed.*)

No. 5.. Report upon the Ontario Institution for the education and instruction of the Deaf and Dumb, Belleville, for the year ending 30th September, 1891. Presented to the Legislature 16th February, 1892. (*Printed.*)

No. 6.. Report upon the Houses of Refuge, Orphan and Magdalen Asylums for the year ending 30th September, 1891. Presented to the Legislature 5th April, 1892. (*Printed.*)

No. 7.. Report upon the Lunatic and Idiot Asylums for the Province for the year ending 30th September, 1891. Presented to the Legislature 16th February, 1892. (*Printed.*)

CONTENTS OF PART II.

No. 8... Report upon the Common Gaols, Prisons and Reformatories of the Province for the year ending 30th September, 1891. Presented to the Legislature 23rd February, 1892. (*Printed.*)

No. 9.. Report upon the Hospitals of the Province, for the year ending 30th September, 1891. Presented to the Legislature 23rd February, 1892. (*Printed.*)

No. 10.. Report of the Registrar-General, relating to the Registration of Births, Marriages and Deaths for the year 1890. Presented to the Legislature 6th April, 1892. (*Printed.*)

No. 11.. Report of the Minister of Education for the year 1891, with Statistics of 1890, in which is included the Reports upon the Scientific Societies, Toronto University, School of Practical Science and Upper Canada College. Presented to the Legislature 24th February, 1892. (*Printed.*)

CONTENTS OF PART III.

No. 12.. Report of the Agricultural and Arts Association for the year 1891. Presented to the Legislature 7th April, 1892. (*Printed.*)

No. 13.. Report of the Standing Committee of the University of Toronto on Finance. Presented to the Legislature 16th February, 1892. (*Printed.*)

No. 14.. Report upon the working of the Tavern and Shop Licenses Acts for the year 1891. Presented to the Legislature 16th February, 1892. (*Printed.*)

No. 15.. Report of the Entomological Society for the year 1891. Presented to the Legislature 16th February, 1892. (*Printed.*)

No. 16.. Report of the Ontario Agricultural College and Experimental Farm for the year 1891. Presented to the Legislature 8th March, 1892. (*Printed.*)

CONTENTS OF PART IV.

No. 17.. Report of the Canadian Institute for the year 1891. Presented to the Legislature 16th February, 1892. (*Printed.*)

No. 18.. Report of the Fruit Gowers' Association for the year 1891. Presented to the Legislature 31st March, 1892. (*Printed.*)

No. 19.. Copy of an Order in Council respecting the commutation of fees payable under the Surrogate Courts Act to His Honour Judge Bell, Judge of the County Court of Kent. Presented to the Legislature 29th February, 1892. (*Not printed.*)

No. 20.. Report of the Commissioner of Crown Lands for the year 1891. Presented to the Legislature 22nd March, 1892. (*Printed.*)

No. 21.. Public Accounts of the Province for the year 1891. Presented to the Legislature 16th February, 1892. (*Printed.*)

CONTENTS OF PART V.

No. 22.. Estimates for the service of the Province until the Estimates for the year are finally passed. Presented to the Legislature 16th February, 1892. (*Not printed.*) Estimates for the year 1892. Presented to the Legislature 18th February, 1892. (*Printed.*) Estimates (supplementary) for the year 1892. Presented to the Legislature 7th April, 1892. (*Printed.*)

No. 23.. Report of the Commissioner of Public Works for the year 1891. Presented to the Legislature 24th February, 1892. (*Printed.*)

No. 24... Report of the Dairymen's Association for the year 1891. Presented to the Legislature 7th April, 1792. (*Printed.*)

No. 25.. Report of the Inspectors of Factories' for the year 1891. Presented to the Legislature 7th April, 1892. (*Printed.*)

No. 26.. Report of the Provincial Board of Health for the year 1891. Presented to the Legislature 6th April, 1892. (*Printed.*)

No. 27.. Report of the Inspector of Legal Offices for the year 1891. Presented to the Legislature 7th April, 1892. (*Printed.*)

CONTENTS OF PART VI.

No. 28.. Report of the Inspector of Division Courts for the year 1891. Presented to the Legislature 29th February, 1892. (*Printed.*)

No. 29.. Report of the Department of Immigration for the year 1891. Presented to the Legislature 25th March, 1892. (*Printed.*)

No. 30.. Report of the Commissioners of the Queen Victoria Niagara Falls Park for the year 1891. Presented to the Legislature 30th March, 1892. (*Printed.*)

No. 31. Bursar's Statement of the cash transactions of the University of Toronto for the year 1891. Presented to the Legislature 7th April, 1892. (*Printed.*)

No. 32.. Statement as to the disposal of the Revised Statutes. Presented to the Legislature 16th February, 1892. (*Not printed.*)

No. 33.. Statement as to the disposal of the Sessional Statutes. Presented to the Legislature 16th February, 1892. (*Not printed.*)

No. 34.. Return to an Order of the House, of the eighth day of April, 1891, giving a tabulated statement shewing by License Districts :—1. The gross amount collected in each License District for (*a*) Fees for licenses. (*b*) Fees for transfers. (*c*) Fees for removals. (*d*) Fines. (*e*) Mileage. (*f*) Costs. 2. The amount expended in each License District for the following purposes :—(*a*) Inspectors' salaries. (*b*) Commissioners travelling expenses. (*c*) Postage and stationery. (*d*) Printing. (*e*) Advertising. (*f*) Fees and disbursements of Counsel. (*g*) Fees in unsuccessful cases. (*h*) Fees in cases of conviction where amounts not collected. (*i*) Detective service. (*j*) Other costs. (*k*) Expenses *re* transfers and removals. (*l*) Sundry expenses. 3. The proportion of the License Fund to which the Municipalities comprising each License District were entitled, and the amounts which were actually paid to them. Such return to be for each year since and including the license year ended the 30th April, 1885, to and including that ended the 30th April, 1890. A like statement for the year ending 30th April, 1882, and also a statement for the license year ending 30th April, 1877, showing the amount collected in each license district; the amount expended therein for inspector's salaries and other disbursements, and the amounts received by the Province and the Municipalities respectively. Presented to the Legislature 16th February, 1892. Mr. *Willoughby.* (*Printed.*)

No. 35.. Return to an Order of the House, of the tenth day of April, 1891, of copies of all correspondence between the Government or any member or officer thereof and the Municipal Council of the Township of Aldborough, or any ratepayer of the Township, on the subject of the Dutton High School or the litigation between the Board of that High School and the Municipality of the said Township in reference thereto, and on the subject of the legislation of last Session affecting the High School, and of all agreements entered into by the Government or any member thereof in reference thereto or in reference to indemnifying the Municipality against loss sustained by reason of such legislation. Presented to the Legislature 16th February, 1892. Mr. *Meredith.* (*Not printed.*)

No. 36.. Return to an Address to His Honour the Lieutenant-Governor, of the fifteenth day of April, 1891, praying that he will cause to be laid before this House, copies of the Commission issued with respect to Prison Reform, and of any instructions accompanying the same or connected therewith. Also, a Return showing in detail all expenses incurred or paid by the Province in connection with the said Commission, giving dates, items, and names. Presented to the Legislature 16th February, 1892. Mr. *Clancy*. (*Not printed.*)

No. 37.. Return to an Address to His Honour the Lieutenant-Governor, of the twenty-second day of April, 1891, praying that he will cause to be laid before this House a copy of the Commission with respect to Fish and Game protection, and of any instructions accompanying the same or connected therewith. Also, for a Return, showing in detail all expenses incurred or paid by the Province in connection with the said Commission, giving dates, items, and names. Presented to the Legislature 16th February, 1892. Mr. *Metcalfe*. (*Not printed.*)

No. 38.. Copy of an Order in Council respecting the commutation of fees payable under the Surrogate Courts Act to His Honour Judge Davis, Junior Judge of the County of Middlesex. Presented to the Legislature 17th February, 1892. (*Not printed.*)

No. 39. Copy of an Order in Council respecting the commutation of fees payable under the Surrogate Courts Act to His Honour Judge McDonald, Judge of the County Court of the United Counties of Leeds and Grenville. Presented to the Legislature 17th February, 1892. (*Not printed.*)

No. 40.. Copy of an Order in Council respecting the commutation of fees payable under the Surrogate Courts Act to His Honour Judge Muir, Junior Judge of the County of Wentworth. Presented to the Legislature 17th February, 1892. (*Not printed.*)

No. 41.. Copy of an Order in Council respecting the commutation of fees under the Surrogate Courts Act to His Honour Judge Benson, Judge of the County Court of Northumberland and Durham. Presented to the Legislature 17th February, 1892. (*Not printed.*)

No. 42.. Copy of an Order in Council respecting the commutation of fees payable under the Surrogate Courts Act to His Honour Judge Ketchum, Junior Judge of Northumberland and Durham. Presented to the Legislature 17th February, 1893. (*Not printed.*)

No. 43.. Copy of an Order in Council respecting the commutation of fees payable under the Surrogate Courts Act to His Honour Judge Ketchum, Junior Judge of Northumberland and Durham. Presented to the Legislature 17th February, 1892. (*Not printed.*)

No. 44.. Copy of an Order in Council raising the Napanee High School to the standing of a Collegiate Institute, to take effect from the first day of September, 1890. Presented to the Legislature 17th February, 1892. (*Not printed.*)

No. 45.. Copy of an Order in Council directing that the Sarnia High School rank as a Collegiate Institute from and after the eighth day of December, 1891. Presented to the Legislature 17th February, 1892. (*Not printed.*)

No. 46.. Copy of an Order in Council approving of the Regulations for the retirement of Professors, Associate Professors, Lecturers, Demonstrators and Officers of the University of Toronto and University College. Presented to the Legislature 17th February, 1892. (*Printed.*)

No. 47.. Copy of an Order in Council amending the Regulations for the retirement of Officers of the University of Toronto and of University College. Presented to the Legislature 17th February, 1892. (*Printed.*)

No. 48.. Copy of an Order in Council approving of by-laws of the Industrial School Association of Toronto. Presented to the Legislature 17th February, 1892. (*Printed.*)

No. 49.. Copy of an Order in Council authorizing the Corporation of the County of Hastings, to invest the sum of $1,600 in Debentures. Presented to the Legislature 17th February, 1892. (*Not printed.*)

No. 50.. Copy of an Order in Council approving of the By-law of the County of Lambton establishing an additional High School in the County to be situated in the Village of Watford. Presented to the Legislature 17th February, 1892. (*Not printed.*)

No. 51.. Copy of an Order in Council approving of an Indenture with the Rose Publishing Company for the publication of the High School Arithmetic. Presented to the Legislature 17th February, 1892. (*Not printed.*)

No. 52... Copy of an Order in Council authorizing the series of copy-books known as the Public Writing Course and directing the discontinuance of those now in use. Presented to the Legislature 17th February, 1892. (*Not printed.*)

No. 53... Copy of an Order in Council approving of By-law No. 40 of the County of Haldimand establishing an additional High School in the Village of Hagersville. Presented to the Legislature 17th February, 1892. (*Not printed.*)

No. 54.. Copy of an Order in Council approving of an Indenture with the Copp Clark Company (Limited), for the publication of the High School History of England and Canada. Presented to the Legislature 17th February, 1892. (*Not printed.*)

No. 55.. Copy of a Minute of the Department of Education approving of Regulations with regard to Text-books. Presented to the Legislature 17th February, 1892. (*Printed.*)

No. 56.. Copy of an Order in Council approving of a certain Indenture with the Canada Publishing Company for the publication of the Public School Drawing Course. Presented to the Legislature 17th February, 1892. (*Not printed.*)

No. 57.. Copy of an Order in Council respecting formation of a Retirement Fund for the retirement of Teachers and Officers of Upper Canada College. Presented to the Legislature 17th February, 1892. (*Printed.*)

No. 58... Report of the Minister of Education on University Extension. Presented to the Legislature 25th February, 1892. (*Printed.*)

No. 59.. Report of the Trustees of Upper Canada College, on the new site and buildings. Presented to the Legislature 25th February, 1892. (*Printed.*)

No. 60... Return to an Order of the House, of the twenty-ninth day of April, 1891, for a Return of copies of all papers respecting the deepening of the Nottawasaga River. Also, showing the amount of money expended upon such works. Presented to the Legislature 19th February, 1892. Mr. *Wylie.* (*Not printed.*)

No. 61.. Return to an Order of the House, of the twenty-fifth day of March, 1891, for a Return of copies of all papers and correspondence, subsequent to that already brought down, between the Government, or any member or officer thereof, and any other person or persons, in reference to widening, deepening, or cleaning out the channel of the Severn River at the outlet of Lake Couchiching, or with reference to any clearing out the channel made by the Public Works Department. Presented to the Legislature 19th February, 1892. Mr. *Glendinning.* (*Not printed.*)

No. 62.. Report of the Inspector for the House of Industry, in the County of Elgin for the year 1891. Presented to the Legislature 22nd February, 1892. (*Not printed.*)

No. 63.. Statement of the Toronto General Trusts Company for the year 1891. Presented to the Legislature 22nd February, 1892. (*Printed.*)

No. 64.. Return to an Order of the House, of the twentieth day of March, 1891, for a Return showing the date of the certificate of the Judges appointed to try the election petition in the North Perth election case. The date when the certificate was received by the Clerk of the House. Copy of the Warrant for the issue of the new Writ for holding an election for the said Riding to fill the vacancy created by the decision of the Judges. Copy of the new Writ for holding the said election. Copies of all correspondence between Members of the Government, or any of them, or any Departmental officer or officers of the House, or with any person or persons with reference to the issue of the said Writ for the holding of the said new Election. Presented to the Legislature 23rd February, 1892. Mr. *Magwood.* (*Not printed.*)

No. 65.. Return to an Order of the House, of the tenth day of April, 1891, for a Return by the Registrars of East and West Toronto showing: (1) The total amount of fees earned during the year 1890. (2) The amount paid to the City of Toronto, or to Government for the City. (3) The amount of remuneration paid the Deputy Registrar. (4) The amount paid other Assistants and Clerks. (5) Amount paid for other purposes. (6) The average rate paid for copying *per* folio where payment was made in that way. (7) The total amount received by the Registrar for his personal use. (8) The expense which the City of Toronto has incurred to complete the divisions of the Registry office. (9) The amount which would have been paid to the City if there had been one Registrar instead of two. Presented to the Legislature 23rd February, 1892. Mr. *H. E. Clarke* (*Toronto.*) (*Not printed.*)

No. 66. Reports of County, Township and Horticultural Societies in Ontario for the year 1890. Presented to the Legislature 24th February, 1892. (*Not printed.*)

No. 67 Copy of an Order in Council respecting the commutation of fees payable under the Surrogate Courts Act to His Honour Judge Morson, Second Junior Judge of the County Court of York. Presented to the Legislature 24th February, 1892. (*Not printed.*)

No 68.. Return to an Order of the House, of the twentieth day of April, 1891, for a Return of copies of all correspondence between the Members of the Government, and other parties on the subject of the alleged education of Medical Students in part, at the public expense by the payment to members of one Medical Faculty of fees received from students for teaching done by Professors and Lecturers, whose salaries are paid entirely out of the funds of the Provincial University. Presented to the Legislature 2nd March, 1892. Mr. *Balfour.* (*Printed.*)

No. 69.. Return to an Order of the House, of the twentieth day of April, 1891, for a Return showing: 1. The number of children said to be under the age of fifteen years, arrested and brought before any Court in this Province during the year 1890. 2. The disposition of such children, shewing the numbers sent to (*a*) The Common Gaol. (*b*) To Industrial Schools or any charitable institution. (*c*) The Reformatory for Boys or Girls. (*d*) Those otherwise disposed of. 3. The number of such children who were tried separate and apart from other offenders, at suitable times, designated and appointed for that purpose pursuant to the Act for the protection and reformation of Neglected Children. Presented to the Legislature 2nd March, 1892. Mr. *Monk.* (*Not printed.*)

No 70.. Return from the Records of the several Elections to the Legislative Assembly, in the Electoral Districts of Kingston, North Renfrew and East Wellington, since the General Election of 1890, showing: (1) The number of votes polled for each Candidate in each Electoral District in which there was a contest. (2) The majority whereby each successful Candidate was returned. (3) The total number of votes polled in each District. (4) The number of votes remaining unpolled. (5) The number of names on the Voters' List in each District. (6) The population of each District as shown by the last Census. Presented to the Legislature 14th March, 1892. (*Printed.*)

No. 71.. Return to an Address to His Honour the Lieutenant-Governor, of the fourth day of March, 1892, praying that he will cause to be laid before this House copies of all correspondence and papers with reference to the appointment of Commissioners to open this House at its present Session or otherwise in regard to the opening of the House by some other than His Honour the Lieutenant-Governor. Presented to the Legislature 6th April, 1892. Mr. *Meredith.* (*Printed.*)

No. 72.. Report of the Master of Titles for the year 1891. Presented to the Legislature 11th March, 1892. (*Printed.*)

No. 73.. Return to an Order of the House, of the sixth day of April, 1891, for a Return showing what municipalities have passed By-laws under the provisions of the 4th section of the Act, 53 Vict. Cap. 55, imposing a business tax in lieu of the tax on personal property and what municipalities, after consideration of the question, have decided not to put the provisions of the said section into effect. Presented to the Legislature 11th March, 1892. Mr. *Barr* (*Dufferin.*) (*Not printed.*)

No. 74.. Despatch from the Right Honourable the Secretary of State for the Colonies, covering copies of communications from Her Majesty the Queen and their Royal Highnesses the Prince and Princess of Wales respecting the death of H. R. H. Prince Albert Victor, Duke of Clarence and Avondale, K.G. Presented to the Legislature 14th March, 1892. (*Printed.*)

No. 75.. Return to an Order of the House, of the seventh day of March, 1892, for a Return of copies of the application of Clara Brett Martin to the Law Society of Upper Canada, for admission as a student-at-law; of the report of the special Committee of the Benchers to which the application was referred; of the Minutes of the meeting of Benchers at which the report was adopted, and of all correspondence on the subject between the Law Society and other parties. Presented to the Legislature 14th March, 1892. Mr. *Balfour.* (*Printed.*)

No. 76. Return to an Address to His Honour the Lieutenant-Governor, of the seventh day of March, 1892, praying that he will cause to be laid before this House copies of all Orders in Council setting apart or allotting out of any fund any sum or sums for the purchase of a site of Upper Canada College or the erection of the College buildings or any buildings on the grounds purchased for such site or for the furnishing or equipment of the College or for any other expenditure on capital account any way relating to the said College. Presented to the Legislature 16th March, 1892. Mr. *Meredith.* (*Printed*)

No. 77.. Return to an Order of the House, of the seventh day of March, 1892, for a Return shewing the names of all persons who were applicants for the position of assistant teacher of German in University College, together with copies of all correspondence between the Minister of Education, the Department of Education and the applicants and other persons relating thereto. Presented to the Legislature 16th March, 1892. Mr. *Whitney.* (*Not printed.*)

No. 78.. Return to an Order of the House, of the eleventh day of March, 1892, for a Return showing the number of pupils attending the Collegiate Institutes and High Schools for the year 1890. Giving, as far as possible, the professions, which in after life, these pupils intend to follow. Presented to the Legislature 16th March, 1892. Mr. *Gibson* (*Huron*). (*Not printed.*)

No. 79. Report of the Commission on the Game and Fish of the Province. Presented to the Legislature 18th March, 1892. (*Printed.*)

CONTENTS OF PART VII.

No. 80.. Return to an Order of the House, of the fourth day of March, 1892, for a Return of copies of all correspondence with the Attorney-General or his Department on the subject of the fusion of the several Divisions of the High Court of Justice, and of changes in the practice of the said Court, and in the provisions for holding sittings for the trial of actions, and otherwise with regard to the distribution of the business of the Courts, with a view to the more speedy dispatch of such business. Presented to the Legislature 18th March, 1892. Mr. *Meredith.* (*Printed.*)

No. 81.. Return to an Address to His Honour the Lieutenant-Governor, of the fourth day of March, 1892, praying that he will cause to be laid before this House copies of the Order in Council for the appointment of a Commission as to the proposed Forest Reservation and Park in the Nipissing District; of the Commission issued in pursuance thereof and the instructions, if any, to the Commissioners. Presented to the Legislature 21st March, 1892. Mr. *Meredith.* (*Not printed.*)

No. 82 . Return to an Order of the House, of the fourth day of March, 1892, for a Return of copies of the case submitted for the opinion of the Court of Appeal as to the validity of the local option provisions of the Municipal Act, and of the opinions of the judges of the said Court thereon, and of the judgment pronounced by the Court in the premises. Presented to the Legislature 21st March, 1892. Mr. *Meredith.* (*Printed.*)

No. 83.. Return to an Address to His Honour the Lieutenant-Governor, of the seventeenth day of April, 1891, praying that he will cause to be laid before this House, copies of all Orders in Council with reference to the withdrawal from sale of mining lands since the 1st of January, 1890, and of all returns or recommendations upon which such Orders in Council were passed. Also, a statement in detail shewing the persons by whom applications for grants of mining lands have been made since the 1st of January, 1889, in such withdrawn district, with the lots or tracts in respect of which such applications were made, and the disposal made of such application. Also, a list of every lot or tract of mining land which has been sold or disposed of since the 1st day of January, 1889, in such withdrawn district, with the names of the person or persons to whom, and the prices at which the same were disposed of, and of the amounts, if any, remaining unpaid on account of such purchases, with the names of the persons by whom the same are owing Presented to the Legislature 29th March, 1892. Mr. *White.* (*Not printed.*)

No. 84... Return to an Address to His Honour the Lieutenant-Governor, of the second day of March, 1892, praying that he will cause to be laid before this House a Return showing: 1. The quantity of pine in unlicensed territory disposed of since last Session. 2. The persons to whom the same was sold and the quantity sold to each of such persons. 3. The prices at which each sale was effected. 4. The terms and conditions of the sales. 5. The purchase money paid, and the amount, if any, remaining unpaid, giving the name of each purchaser, any part of whose purchase money is paid, and the amount unpaid by him. 6. Copies of the Orders in Council authorizing the sales, and the reports and other material on which the same were based. Presented to the Legislature 29th March, 1892. Mr. *Marter.* (*Printed.*)

No. 85.. Return to an Address to His Honour the Lieutenant-Governor, of the fourth day of March, 1892, praying that he will cause to be laid before this House a copy of the Order in Council for the sale and transfer of the Dundas and Waterloo Macadamized Road, and of all reports on which said Order in Council was based, and for a statement in detail of the receipts by the Province from the said road Presented to the Legislature 29th March, 1892. Mr. *Meredith.* (*Printed.*)

No. 86.. Return of all fees and emoluments received by the Registrars of Ontario for the year 1891. Presented to the Legislature 29th March, 1892. (*Printed.*)

No. 87.. Return to an Order of the House, of the seventh day of March, 1892, for a Return showing the names of all persons or bodies who have received remuneration for holding religious services in the various Asylums of the Province as *per* statement on page 44 of the Report of the Inspector of Asylums for the year 1891. Presented to the Legislature 29th March, 1892. Mr. *Campbell* (*Durham*). (*Not printed.*)

No. 88.. Report of the Bureau of Mines for the year 1891. Presented to the Legislature 30th March, 1892. (*Printed.*)

No. 89.. Report of the Commission appointed to enquire into the claims made by the Township of Proton, in the County of Grey, to certain sums of money payable as alleged, to that Municipality for Public Improvements therein, under 16 Vict. cap. 159, sec. 14. Presented to the Legislature 31st March, 1892. (*Printed.*)

No. 90.. Return to an Order of the House, of the twentieth day of March, 1891, for a Return showing the amounts in yearly aggregate of all sums received from the sales of lands for agricultural purposes in Algoma East, from January 1st, 1871, to December 31st, 1891. All sums received from the sales of mineral land in Algoma East, during the same period. All sums received for bonuses, ground rents, or timber dues, or in respect of or from the sale of timber in Algoma East during the same period. All sums received from the collection of taxes upon lands in Algoma East during the same period. All sums received from the issue of liquor licenses in Algoma East during the same period; and all sums expended by the Government in the said electoral district of Algoma East for colonization roads or other public purposes during the same period. Presented to the Legislature 31st March, 1892. Mr. *Campbell* (*Algoma*). (*Printed.*)

No. 91.. Return to an Order of the House, of the 24th day of February, 1892, for a Return showing the number of persons confined in the different Gaols of the Province as indigent persons, unable to support themselves, and the length of time each person has been confined. Also, a Return showing the number of insane persons confined in the Gaols of the Province, the length of time each person has been confined, and the reason for being so confined. Presented to the Legislature 4th April, 1892. Mr. *Barr* (*Dufferin*). (*Printed.*)

No. 92.. Return to an Order of the House, of the eighteenth day of March, 1892, for a Return of copies of all correspondence, since the last Return, between any member of the Government and any other person or persons on the subject of the alleged education of medical students in part at the public expense, by the payment to members of one Medical Faculty of fees received from students for teaching done by Professors and Lecturers, whose salaries are paid entirely out of the funds of the Provincial University. Presented to the Legislature 4th April, 1892. Mr. *Balfour*. (*Printed.*)

No. 93.. Return to an Order of the House, of the first day of April, 1892, for a Return of copies of all correspondence between the Minister of Education, or any officer of his Department, and the Principal of Upper Canada College; between the Minister or any officer of his Department and the Trustees of the College; between the Principal and Trustees of said College and the Minister, or any officer of his Department, and any officer of the University of Toronto, in reference to the expenditures for the new site and buildings for the College, or the endowment of the College, or otherwise in reference to any expenditure assumed to be made under the authority of the Statute relating to the endowment of the College. Presented to the Legislature 4th April, 1892. Mr. *Miscampbell*. (*Printed.*)

No. 94.. Return to an Address to His Honour the Lieutenant-Governor, of the twenty-ninth April, 1891, praying that he will cause to be laid before this House a Return showing: (1) A list of the names of all companies incorporated by special Act or under the Act intituled "An Act respecting the incorporation of Joint Stock Companies by Letters Patent" with powers of Trust Companies. (2) Copies of all Orders in Council, Reports to Council and papers in relation to the incorporation of any such Company, and all correspondence passing between the Government or the Attorney-General, and any such Company or any person in reference to the incorporation of any such Company and the powers applied for or to be granted. (3) Copies of all Orders in Council passed in relation to any such Company under R.S.O. Chap. 157, sec. 74. (4) Copies of all agreements or contracts entered into with any such Company, for the investing through the instrumentality of such Company of the funds standing from time to time in the High Court of Justice or any part thereof, and of all bonds or securities taken from the investing Company as a guarantee against loss. (5) A Return of the amount of money in the High Court of Justice invested through the instrumentality of any such Company, with the name of such Company, during each of the years from 1881 to the present session, and of the amount now so invested, and of all orders and regulations of the Court in reference to the same. (6) A Return of the actual amounts of money lying in the High Court during each of the years from 1881 to the present session, including the amount invested. (7) Copies of all correspondence and papers passing between the Government or any member thereof, and the Judges of the High Court or any such Company in respect of any applications of any such Company to share in the business of investing moneys in the High Court of Justice or to enable public competitions for such business, and also copies of all papers in or relating to any application on the part of any such Company to the Judges of the High Court of Justice for any such purpose. (8) A Return of the amounts received from such Company in respect of moneys invested by them during each of the years from 1881 to the present session, and of amounts for interest, showing also the rate of interest allowed to suitors in respect of moneys lying in the High Court of Justice during the same period, and also of the use or application made of the difference between the interest received by the Court in respect of moneys invested and in the amount allotted and allowed to suitors, in respect of moneys lying in Court. (9) A Return showing the names of officers and directors and shareholders of all Companies through whose instrumentality the funds in the High Court of Justice have been and are being invested. (10) A Return showing the duties of the official guardian in respect of suitors in the High Court of Justice and minors, and in relation to moneys in the High Court of Justice, and the business of the Court generally, and of any change made in regard to his duties since the first day of January, 1889. Presented to the Legislature 6th April, 1892. Mr. *McMahon.* (*Not printed.*)

No. 95.. Report of the Secretary and Registrar of the Province for the year 1891. Presented to the Legislature 7th April, 1892. (*Printed.*)

No. 96.. Bonds and Securities of Public Officers for the year 1891. Presented to the Legislature 7th April, 1892. (*Not printed.*)

No. 97 .. Return to an Order of the House, of the twenty-third day of March, 1892, for a Return showing the date when the persons to whom, and price for which timber berth No. 118, North Shore of Lake Huron was sold, the respective dates when, and the amounts in which, and persons by whom, the bonus was paid. The date when the said limit was first placed under license, and the persons to whom the license was issued. Copies of all transfers of the said berth, or of any interest therein and copies of all correspondence, memoranda, rulings of the Commissioner of Crown Lands, or any other officer of his Department with reference to the said berth. And also, copies of all reports made to the said Department by any wood ranger or other officer of the Department as to the quantity of timber in the said berth. Presented to the Legislature 12th April, 1892. Mr. *Marter.* (*Not printed.*)

No. 98.. Return to an Order of the House, of the twenty-sixth day of February, 1890, for a Return of copies of all Departmental orders or correspondence with reference to the appointment of A. F. Dulmage as an officer of the Crown Lands Department. Also, copies of all correspondence between the Crown Lands Department or any officer thereof, including the Commissioner of Crown Lands, and the said Dulmage, (including all letters of instruction sent to him) since his appointment; also copies of all accounts furnished by him to the said Department. A full statement of all moneys received or collected by the said Dulmage, showing the dates when the same were received or collected, and on what account and from whom. A like statement of the moneys paid over by him to the said Department, and of the moneys misappropriated by him, or for which he did not account. Also, copies of all correspondence relating to his defalcation, between any member or officer of the Government and the said Dulmage or any other person, and of all reports in reference thereto, and a statement of the amounts paid to or received by the said Dulmage for salary or expenses in each year since his employment began. Presented to the Legislature 12th April, 1892. Mr. *Marter.* (*Not printed.*)

No. 99.. Return showing the indebtedness of Municipalities to the Government on the 1st January, 1892. Presented to the Legislature 12th April, 1892. (*Not printed.*)

ANNUAL REPORT

OF THE

AGRICULTURE AND ARTS ASSOCIATION

OF THE

PROVINCE OF ONTARIO

1891.

PRINTED BY ORDER OF THE LEGISLATIVE ASSEMBLY.

TORONTO:
PRINTED BY WARWICK & SONS, 68 AND 70 FRONT STREET WEST
1892.

CONTENTS.

PAGE.

LETTER OF TRANSMISSION 1
ANNUAL MEETING, March, 1891 3
  Secretary's Report 4
  Horse Associations 5
  Cattle Associations 5
  Sheep Associations 6
  Swine Associations 6
  Prize Farms 6
  Ontario Veterinary College 7
  Fat Stock Show 7
  Plowing Matches 7
  World's Columbian Exhibition 7
  Office Work 7
Committees 8
Stallion Show 11
Council Meeting, June 18
World's Columbian Exposition Committee, September 20
Stock Show Committee 21
Fat Stock Show at Guelph 23
World's Columbian Exposition Committee, November 23
Meeting of Council, December 27
Report of Judges on Prize Farms 33
  Norman L. Campbell, Township of Eldon 35
  McEachran Bros., “ “ 35
  Peter Cameron, “ Bexley and Carden 36
  Mr. Blanchard, “ “ 37
  J. D. Naylor, “ Fenelon 37
  John Willocks, “ “ 38
  Robt. Oxby, “ “ 39
  James S. Jordan, “ Eldon 39
  James Davidson, “ Smith 39
  J. F. Davidson, “ “ 40
  G. W. Mann, “ “ 42
  Andrew Young, “ North Monaghan 44
  Nicholas Dawson, “ “ 44
  Joseph Dawson, “ South Monaghan 45
  John Lucas, “ “ 45
  James Russell, “ Hamilton 45
  A. M. Westington “ “ 47
  Wm. Westington & Sons, “ “ 47
  W. A Martin “ Thurlow 48
  J. O. Huffman, “ “ 48
  G. N. Clare, “ Hungerford 50
  Thomas Caskey, “ Madoc 50
  John Mackey, “ Carlow 52
  John Campbell, “ Mayo and Carlow 52
  James Martin, “ Horton 53
  John Airth, “ “ 55
  John Gibbons, “ “ 57
  Donald Campbell, “ Admaston 57
  Peter Campbell, “ “ 58
  George Cardiff, “ “ 58
  Romain Mosier “ Wolfe Island 59
  Richard Moore, “ “ 60
  George Wills, “ “ 60

Report of Judges on Prize Farms.—*Continued.* PAGE

J. B. Aylesworth, Village of Newburgh 62
Wm. Dolmage, Township of Camden East 62
J. S. Jordan, “ Eldon 63
Daniel Kelly, “ Asphodel 64
George English, “ “ 64
H. Humphries, “ “ 65
H. J. Mouch, “ Hungerford 66
Sidney Way, “ “ 66
J. V. Ketcheson, “ Thurlow 68
John Huffman, “ “ 68
Albert Jones, “ “ 69
T. C. Stark, “ Pittsburg 69
Summary of Report 71
Provincial Plowing Matches 71
Districts 1, 2 and 3 71
“ 4, 5 and 6 73
“ 7, 8 and 9 76
“ 10, 11, 12 and 13 79
Swine Breeders' Association 79
Annual Dinner of Fat Stock Club 81
President's Annual Address 81
Hon. John Dryden's Address 83
Report of Fat Stock Show 85
Cattle 86
Sheep 87
Hogs 88
Poultry 89
Financial Statement 90
Prize Awards for Horses and Cattle at Exhibitions held at Toronto, London and Ottawa 91

Horses :

Thoroughbred Horses 91
Roadster Horses 93
Carriage Horses 96
Hunters and Saddle Horses 99
Horses for General Purposes 101
Agricultural Horses 102
Clydesdales 104
English Shire Horses 108
Heavy Draught Horses 110
Suffolk Punch Horses 113
Percheron or French Draught Horses 113
Hackney Stallions 114

Cattle :

Short Horns 114
Herefords 118
Polled Angus 120
Galloways 122
Devons 124
Ayrshires 126
Jerseys 129
Holsteins 132
Stock Show Committee 134
Ontario Veterinary College—Graduating Classes 136
Treasurer's Report 138
Abstract Financial Statement 143

FORTY-SIXTH ANNUAL REPORT

OF THE

AGRICULTURE AND ARTS ASSOCIATION,

1891.

To the Honorable the Minister of Agriculture :

I have the honor on behalf of the Council of the Agriculture and Arts Association of Ontario, to present the report of their proceedings for 1891, the report of the Spring Stallion Show, the report of the Prize Farm Judges, the report of four Provincial Plowing Matches, the report of Fat Stock Show at Guelph, the report of Prize Awards at Toronto, London and Ottawa, and a list of the graduates of the Veterinary College for 1891.

I have the honor to be,

Your obedient servant,

HENRY WADE,

Secretary.

TORONTO,
Feb. 1, 1892,

FORTY-SIXTH ANNUAL REPORT

OF THE

AGRICULTURE AND ARTS ASSOCIATION

OF ONTARIO.

ANNUAL MEETING.

The annual meeting of this Association was held in the Board Room, corner of Queen and Yonge Streets, Toronto, on March 12th and 13th, 1891.

The chair was taken at 8 p.m. by Albin Rawlings, Forest, President for 1890, and there were present: Messrs. Ira Morgan, Metcalfe, District No. 2; Joshua Legge, Gananoque, District No. 3; James Haggerty, West Huntingdon, District No. 4; R. Vance, Ida, District No. 5; J. C. Snell, Edmonton, District No. 6; N. Awrey, M.P.P., Binbrook, District No. 7; Wm. Dawson, Vittoria, District No. 9; James Rowand, M.P., Dunblane, District No. 10; C. M. Simmons, Ivan, District No. 11; A. Rawlings, Forest, District No. 12; Jonathan Sissons, Crown Hill, District No. 13; Hon. John Dryden, Minister of Agriculture; and the Secretary, H. Wade.

Not present: D. M. Macpherson, Lancaster, District No. 1; and J. C. Rykert, St. Catharines, District No. 8.

The minutes of the previous meeting were read by the Secretary and formally adopted. A letter was read from J. C. Rykert, expressing regret that illness prevented him from attending. In a communication from A. Blue, Deputy Minister of Agriculture, the following persons were reported to have been elected to represent their respective Agricultural Divisions in the Council of the Agriculture and Arts Association:

No. 1 Division	D. M. Macpherson	Lancaster.
No. 2 Division	Ira Morgan	Metcalfe.
No. 3 Division	Joshua Legge	Gananoque.
No. 4 Division	James Haggerty	West Huntingdon.

Mr. LEGGE moved that Mr. Vance be the President of the Association for the ensuing year. The motion was carried unanimously.

The retiring President, Mr. RAWLINGS, addressed the meeting as follows: I have to thank you for having put me in the position I have occupied during the past year. You have always been willing to assist me in whatever undertaking I have had in connection with my office. Early in the season an impression seemed to prevail that we should have nothing to do, but how far astray that is I need not tell you. The fat stock show at Guelph was a grand success, and the show held at Toronto equally as good, and I think, taking these and other considerations, that there is no reason to grumble or complain that this Association is dying out. I think, on the contrary, that it is rising to what it ought to be. It is something that other societies have not been. I thank you for the honor you have done me during my term of office.

Mr. VANCE, on taking the chair, was received with applause. He said: I am sure I must thank you heartily for placing the confidence in me you have, a confidence I do not feel I am worthy to take. I do not intend to make a speech to-night, as speech-making is not my forte, but when there is any work to be done, you may depend upon me to be the right man in the right place. I will leave the speaking in the able hands of my friend Mr. Awrey. I thank you again, and consider it a high honor, not alone to myself but to the district I represent.

Mr. AWREY, who was unanimously chosen to fill the post of Vice President, said that he appreciated the honor. It was unexpected. When he became a member of the Board, he felt he was anything but a popular addition to it. Three or four years ago the Board was not popular with the people of Ontario. Whether rightly or wrongly he could not say, but the opinion seemed to prevail that its usefulness had gone. People, however, would be made to see that perhaps its usefulness had not altogether disappeared, and as an example to illustrate the statement, the speaker pointed out the success which had attended the Association in holding under its auspices the fat stock show at Guelph and the stallion show at Toronto, which could not fail to add prestige to the Board. If the members of the Board discharged their duties in connection with the Chicago Fair, in 1893, they would not fail to regain whatever popularity they had lost in the minds of the people of Ontario. There was undoubtedly a future before the Board, and the speaker had no doubt of its utility and usefulness. He believed a motion would not carry in the Local House to abolish the Agriculture and Arts Association. He thanked the members for having elected him to his high office.

A committee to strike standing committees, consisting of Messrs. Snell, Morgan, Simmons, Legge and Awrey, was then appointed to report at the morning meeting.

Mr. LEGGE.—There is a very important meeting to be held at the Walker House this evening, and it is the wish of a great many of the delegates that the members of this Board should be present. I would therefore move that we adjourn until to-morrow morning.

It was decided to hear the report of the Secretary before adjourning.

SECRETARY'S REPORT FOR 1891.

To the Council of the Agriculture and Arts Association of Ontario:

GENTLEMEN,—I herewith present my Annual Report of the business done at this office, during the last twelve months.

REGISTRATION OF LIVE STOCK.

	Males.	Females.	Total.
Horses—			
Clydesdale Vol. V..........	268	326	594
Shire or Cart Vol. 1..........	41	15	56
Draught Horses Vol. 2..........	83	95	178
Office Record Vol. 1..........	23	16	39
	415	452	867
Cattle—			
Ayrshire Vol. 1..........	150	100	250
Hereford..........	22	20	42
Polled Angus..........	5	9	14
Devon..........	7	6	13
	184	135	319

Swine—

	Males.	Females.	Total.
Berkshire	431	540	971
Yorkshire	195	239	434
Suffolk	22	21	43
	648	800	1448

Our cash receipts for registration in 1890 were	$2,356.95
For Stud Books sold	432.90
Total	2,789.85
Against receipts in 1889	2,229.26
Or an increase of	560.59

This shows a gratifying success, and is in excess of the year 1883, the largest year we had while editing the Canada Shorthorn Herd Book. The following are Live Stock Associations, in affiliation with our Association :

HORSES.

Clydesdale Horse Association.—The fifth Annual Meeting of this Association has just been held, and the report is very satisfactory. 241 members have paid their annual subscription, and Vol. IV. has been sent out to all subscribers. The annual Spring Show was a great success, about 50 Clydesdale stallions were entered, the attendance was good and a great many sales were made at remunerative prices. Vol. V. is now in the hands of the printer and will soon be ready for distribution ; it will contain the pedigrees of 268 stallions and 326 mares, total 594, of which 148 were imported ; the rest are Canadian bred. It is very pleasing to think there are now so many pure Clydesdales in Canada, held for breeding purposes.

Shire Horse Association.—The third Annual Meeting of this Association has been held, and as only 56 horses, 30 of which were imported, have been recorded during the past year, it was decided to leave the first Volume open for another year. They also voted $50 towards the Spring Stallion Show, in addition to the amount given by our Association.

Canadian Draught Horse Association.—The Annual Meeting of this Association was called for the 23rd of February, but there not being a quorum present, the same officers consequently remain in office for the coming year. 173 horses were recorded during the last year ; 82 Stallions and 91 Mares. As these horses have mixed breeding, Clyde and Shire, the U. S. Customs authorities, after the passing of the McKinley Bill, at first refused to allow them to pass, but I understand they take them now at the same standard as to crosses as is exacted in the Clydesdale Association. This Association numbers 60 members.

Office Record.—In this we have recorded 39 animals. It was however decided at the last Clydesdale meeting, that no certificate after this date be granted, as owners were using them to take their horses to the United States.

CATTLE.

Dominion Short Horn Breeders' Association.—This Association was assisted last year by a grant of $1,000 from the Agriculture and Arts Association, to help them to print the old pedigrees. Their own income from members' fees was $1,765, and from registrations $3,043.75, an increase of $375.25, over last year. The number of Short horns recorded in 1890, was 3,166. The Fifth Volume was printed and sent out to Members paying $2 each, and the Sixth Volume commenced.

Dominion Ayrshire Breeders' Association.—Have just held their Annual Meeting. There are 48 members. The First Volume of the new series, containing 3,171 pedigrees, is being printed, and will shortly be distributed to members. It was decided to make a second assessment for members' fees. 250 cattle were recorded during the last year.

Dominion Hereford Breeders' Association.—This was started on the 11th December last at Guelph, during the Fat Stock Show. Great interest is already being taken in it. Forty-four animals were recorded during the last year. F. W. Stone of Guelph was elected President, and the Hon. M. H. Cochrane, Vice-President.

Polled Angus and Devon Cattle.—These cattle are also recorded, but no Association for Canada has as yet been formed.

SHEEP.

We have commenced a Dorset-horned Sheep Record, in affiliation with the Sheep-Breeders' Association, and the sheep already recorded pass the lines, without duty; other kinds of sheep records will no doubt be started shortly.

SWINE.

Berkshire.—Nearly 1000 of these have been recorded this year, we now have a total of over 3,600, quite enough to make a large sized volume, and it is our intention to print during the coming season. We are now waiting for a revising committee to be appointed by the Berkshire Branch of the Swine-Breeders' Association.

Improved Yorkshire.—Nearly 500 of these have been recorded during the last season, making a total of about 625 towards the first volume; we will soon have to print a book for them.

Suffolk.—A few of these, about 50, have been recorded during the past season. We have been asked to start a Register for Poland China and other breeds, and are ready to do so at any time the breeders require us.

PRIZE FARMS.

In 1890, group No. 4, consisting of the Electoral Districts of Peel, Cardwell, the Yorks, the Simcoes, Algoma, the Ontarios and the Durhams were inspected. A goodly number of farms were entered, and an able report of the inspection has been written up by Mr. John I. Hobson, of Mosborough, one of the judges and will appear in our report to the Minister of Agriculture. Group No. 5 will be inspected this year.

1. Prizes will be awarded by the Agriculture and Arts Association of Ontario for the best managed Farms in Group No. 5, comprising the following Electoral Districts, with their various Township Societies:

1. VICTORIA N.
    - Bexley and Carden.
    - Eldon.
    - Fenelon.
    - Laxton, Digby and Longford.
    - Rama, Dalton and Ryde.
    - Somerville.
2. VICTORIA S.
    - Emily.
    - Mariposa.
    - Ops.
    - Verulam.

3. PETERBOROUGH.
    - Burleigh.
    - Douro and Dummer.
    - Galway.
    - Otonabee.
4. PETERBOROUGH W.
    - Monaghan S.
    - Smith, Ennismore and Lakefield.
5. NORTHUMBERLAND E.
    - Brighton.
    - Cramahe.
    - Murray.
    - Percy.
    - Seymour.
6. NORTHUMBERLAND W.
    - Alnwick.
    - Haldimand.
    - Hamilton.
7. HASTINGS E.
    - Hungerford.
    - Thurlow.
    - Tyendinaga.
8. HASTINGS N.
    - Bangor, Wicklow, Monteagle, etc.
    - Dungannon and Faraday.
    - Mayo and Carlow.
    - Rawdon.
    - Tudor and Cashel.
    - Wollaston.
9. HASTINGS W.
10. PRINCE EDWARD.
    - Ameliasburg.
    - Hallowell.
    - Marysburg S.
    - Sophiasburg.
11. LENNOX.
    - Amherst Island.
    - Ernesttown.
12. ADDINGTON.
    - Camden.
    - Loughborough.
    - Portland.
13. RENFREW N.
    - Grattan and Wilberforce.
    - Pembroke, Stafford and Alice.
    - Ross and Bromley.
14. RENFREW S.
    - Lynedoch and Brudenell.
    - McNab.
15. FRONTENAC.
    - Storrington
    - Wolfe Island.

Mr. Wm. Donaldson of West Zorra, was the second Judge, and the expense for judges and medals was $215.20. You will require at this meeting to appoint the judges for 1891.

ONTARIO VETERINARY COLLEGE.

This College graduated nearly 175 students, showing the popularity of Dr. Smith, the president. To each one a Diploma was given by this Association.

FAT STOCK SHOW.

The seventh was held at Guelph, on the 10th and 11th December last; it was held in conjunction with the Guelph Fat Stock Club, and was a good success; both cattle and sheep were of the best. A full account will be found in our Annual Report for 1890.

PLOWING MATCHES.

Three of these were held in October, one at Peterborough, one at Barrie and the third at Hamilton; they were all well attended and no doubt will be the means of doing a great deal of good.

WORLD'S COLUMBIAN EXHIBITION.

A small grant was put down in the requirements for working up exhibits for this Fair, and a resolution passed, backing up the request, that this Association be the medium through which the exhibits be collected.

OFFICE WORK.

As the Provincial Exhibition was not held this year, the work has been somewhat less, still with the increase of registrations, a large correspondence is kept up, and fully 4,000 letters and post cards have been sent out.

The Secretary in concluding, begs leave to thank the Council for the three months holiday granted him to visit England and Scotland. He returned with renewed vigor, and well pleased with his visit to the Old Land. He has prepared a report of the things he has seen, which will be found in the last Annual Report to the Minister.

HENRY WADE,
Secretary.

The report, on motion of Mr. Simmons, seconded by Mr. Dawson, was adopted.

Mr. Awrey moved, seconded by Mr. Morgan, that the members of the Board of Agriculture and Arts Association desire to place on record their appreciation of the labors of our retiring president, Mr. Rawlings, and express their appreciation of the uniform courtesy extended to the Board, and also express the hope that they may have for many years the benefit of his wise council and assistance in directing the affairs of this Board.

Mr. Legge: We all concur in this resolution. It does not require any remarks.

The motion was carried unanimously.

Mr. Rawlings: I did not expect anything like this, because I never considered myself worthy of it. I thank you one and all for your vote of thanks. I hope I will continue to gain your favor in the future as I have done in the past.

The following motion, which was moved by Mr. Awrey, was carried:

"That whereas a large share of the success of our shows depends upon the nature of the accommodation provided both for the exhibits and visitors, and whereas the City of Toronto has willingly fitted up the drill-shed so generously provided by Col. Otter, which has enabled the Board to hold the most successful spring show in the history of the Province, be it therefore resolved that the thanks of this Association be tendered the Mayor and Council of the city for their very active interest in the success of our spring exhibition, and also to Colonel Otter for his willingness to furnish us with so suitable a building."

MORNING SESSION.

The President took the chair at 10 a.m., March 13. All the members present at the evening session were in their places.

The report of the committee appointed to strike the standing committee for the ensuing year was laid on the table as follows:

Executive—Awrey, Rykert, Snell, Simmons, Morgan.

Finance and Printing—Awrey, Legge, Sissons, Rowand, Dawson

Stock Shows—Snell, Rawlings, Simmons, Awrey, Legge.

Herd Book—Rowand, Snell, Morgan, Haggerty, Dawson.

Short Horn Committee—Simmons, Snell, Rowand, Dawson, Sissons.

Prize Farms—Morgan, Haggerty, Legge, McPherson.

Central Farmers' Institute Delegate—Mr. Legge.

World's Fair Committee—Awrey, Snell, Rawlings, Wade.

The report was adopted without alteration.

Mr. LEGGE.—I gave notice of the following resolution at our last meeting, which I desire to introduce for your consideration:

Moved by myself, seconded by Mr. Rawlings, That the Minister of Agriculture of Ontario be asked to take into consideration the advisability of granting medals to six of the largest city exhibitions divided over the Province containing the largest number of members, that is, a gold, silver and bronze medal, to each as leading provincial prize to be given for live stock on such classes as the directors of the different associations may direct, and that the president, vice-president and mover be a committee to wait upon the Minister of Agriculture in reference to this resolution.

The mover, in supporting his resolution, said the cost of the medals would not be very great, and, in his opinion, they would be using them on the same footing as the County societies.

Mr. AWREY.—I think we will require to be a little careful. We are crowding the Minister of Agriculture from all parts of the Province. He is increasing very largely the grants for agricultural purposes this year. The question is whether his colleagues will feel like bearing too much pressure the first year we have a new Minister. I know he is only too anxious to look after the desires of the farmers of the province. Every department of agriculture is asking for a largely increased grant. If we continue to ask it is a question if the Government won't refuse.

Mr. RAWLINGS pointed out that Mr. Legge in bringing forward the resolution was only doing so in order to satisfy a request of the people of the constituency he represented.

Mr ROWAND advocated careful procedure. They were pressing the Minister of Agriculture pretty hard. The amount of money was not large. The Association, however, did not entertain particularly warm feelings towards what is known as large societies such as mentioned in the resolution, as they had been established for the purpose of killing the Provincial Exhibition. He could not view the motion under the circumstances with a favorable eye.

Mr. MORGAN reiterated the remark of the previous speaker.

Mr. SIMMONS advocated the withdrawal of the resolution.

Mr. AWREY said the central institutions had not done a great deal to assist the Provincial Exhibition. A great many of them were about exhausted and when their usefulness had departed there would be an outcry for the provincial exhibition again whether it was a part of their—the Agriculture and Arts Association—duty to keep these associations alive he (the speaker) could not for a moment undertake to say.

Mr. MORGAN was opposed to assisting the cities, and cited the treatment the association had received in past years at the hands of Ottawa, Kingston, and London as an example in his opposition to the motion.

Mr. DAWSON.—The cities are all against us.

Mr. LEGGE.—After hearing the expressions of the members of the Board, I withdraw the motion.

The following communications were laid on the table from the secretaries of the South Renfrew and West Huron Agricultural Societies.

RENFREW, January 30th, 1891.

DEAR SIR.—At the annual meeting of the South Renfrew E. D. Agricultural Society on the 21st inst., the following resolution was passed: "Moved by David Barr and seconded by A. A. Wright. That this meeting expresses its appreciation of the action of the Agriculture and Arts Association in giving one silver and one bronze medal to each E.D. Agricultural Society, but regret that the number is so small. That the Provincial Association be requested to give at least ten medals to each Society, and consent to furnish as many more as may be needed at actual cost.

And this meeting is further of the opinion that the Electoral District Societies are doing the most good of all the exhibition societies for the advancement of the agricultural interests of the country. This meeting would therefore respectfully solicit the Ontario Government to increase the amount of annual grant to these societies by three hundred dollars, making a total of one thousand dollars, the extra grant to be applied to the prize list and expenses of the E. D. Agricultural Societies. And that a copy of this resolution be sent to the Hon. the Minister of Agriculture and to the Secretary of the Agriculture and Arts Association of Ontario.

Your obedient servant,
ROBT. McLAREN,
Secretary.

GODERICH, Jan. 26, 1891.

DEAR SIR,—I am instructed by the Directors of the West Huron Electoral District Agricultural Society to make application for the silver and bronze medals offered to each Society by your Association, as set forth in your circular letter of date Jan. 2nd. They will be offered for competition as recommended by your Association.

If this application is not sufficient, please notify me what is required.

Respectfully yours,
JAMES MITCHELL,
Secretary.

Mr. DAWSON moved the following motion: "That the money offered by this Association to encourage plowing matches in the province be divided into four parts of $150 each, and the districts comprising each division be as follows: No. 1 division to comprise Districts Nos. one, two, three of the Agriculture and Arts Association; No. 2 division to comprise four, five and six; No. 3 division to comprise seven, eight and nine; No. 4 division to comprise ten, eleven, twelve and thirteen; and that the Directors of each division be an Executive Committee in the respective divisions to superintend the expenditure of the grant for plowing match purposes, and the choosing of the places for the contests."

Mr. LEGGE pointed out that no plowing match had been held in the east last year, and that an understanding existed that a sum of money was to be set aside for this year in lieu of last year's non-competition.

Mr. AWREY explained that the district Mr. Legge represented had lost the money. There was a report about a plowing match having taken place there last year, and the Board objected to paying money on account of it not having taken place under the auspices of the Agriculture and Arts Association.

Mr. MORGAN explained that a plowing match had been held at Merrickville, and he had paid the prize money for the same out of his own pocket. The match had been a successful one, but the Chairman of the Finance Committee had refused to pay the money on account of the bill showing it had not been held under the auspices of the Agriculture and Arts Association.

Mr. ROWAND.—If the match comes off this year I would like to know how the money is to be expended?

Mr. LEGGE.—There will be two plowing matches this year.

Mr. AWREY did not think they had the power to change the schedule. They had asked the Legislature for $600 for plowing contests for 1891, and they could not increase the amount by $150, as the estimates would have to be changed and get the consent of the Legislature to do so.

Mr. ROWAND.—I object to punishing a district for the neglect of a member.

It was moved by Mr. Legge, seconded by Mr. Morgan, in amendment, "That $150 be added to the resolution to hold the plowing match in Nos. 1, 2 or 3 districts that was not held last year."

Mr. SIMMONS said his sympathies were with the district, but he did not want to make himself appear foolish by voting away money they had not in their power to give.

The PRESIDENT.—This money was not taken into consideration as a balance when we made our estimates last year.

Mr. AWREY explained how the Finance Committee had acted in making up the estimates, and thought that, after a careful examination of the requirements for the year had been looked into and provided for, they could hardly vote for more money than the Legislature had been asked to give the Board.

Mr. WADE explained $350 had been given to the fat stock show.

Mr. LEGGE said that, as far as the show was concerned, the people of his district did not derive any benefit from it. The plowing match was the only thing they had in the east. He did not think that there should be any misunderstanding about the $150 being granted, after the understanding they had arrived at at the December meeting of the Board.

The amendment was put and lost, and the original motion on being placed before the members was unanimously carried.

Mr. AWREY moved, seconded by Mr. Snell, "That the report of the auditors for 1890 be adopted." The motion was carried.

Messrs. John I. Hobson, Mosborough, and F. W. Hodson, London, were appointed judges on prize farms.

It was also decided to have the medals for the Electoral District Societies properly engraved with the names of the different counties on them. Messrs. Awrey and Wade were also authorised to pay any immediate and necessary accounts which in their opinion ought to be settled.

The meeting then adjourned until June 24, when the subject for discussion will be the advisability of selling the present building in which the business of the Association is held, and purchasing a large and commodious property and building which can be utilised not only for the routine business of the Association, but for the other Agricultural purposes of a larger and wider sphere.

STALLION SHOW.

A meeting of Council of Agriculture Stock Show Committee and Clydesdale Horse Association Directors was held in the office of the Council of Agriculture, on Jan. 16th, 1891. Present: A. Rawlings, Forest; N. Awrey, M.P.P., Binbrook; R. Vance, Ida; C. M. Simmons, Ivan, and J. C. Snell, Edmonton, from Council of Agriculture; Wm. Smith, M.P., Columbus, President; R. Graham, Claremont; R. Beith, Bowmanville, Robt. Miller Brougham, and Arthur Johnston, from Clydesdale Association.

The Secretary, H. Wade, explained the object of the meeting, and that he had failed to secure a building suitable for a spring show for all kinds of live stock, but had, through the courtesy of Lieut.-Col. Otter, secured the drill shed for two days, which would only do for a horse show, and that he had taken the responsibility of calling the two committees together in order to form a joint committee to hold such a show.

This joint committee decided that it would be advisable to give premiums to entire horses, as follows: To Thoroughbreds, Carriage or Coach, Roadsters, Hackneys, Clydesdales, Shire, Suffolk Punch and Percherons.

On motion of C. M. Simmons, seconded by R. Vance, it was resolved that the following proposition of the Clydesdale Association for terms of amalgamation for holding a Spring Stallion Show be accepted, viz: That the Agriculture and Arts Association make a grant of a sum not less than $100 towards the prize list for Clydesdales. That the additional amount for prizes for Clydesdales be furnished by their Association, that they have the preparation of the prize list in their own classes and the appointment of their own judges, and that they have no responsibility for expenses, and no claim for receipts. —Carried.

It was resolved by the Stock Show Committee that other Horse Breeders' Associations be allowed to duplicate or give sweepstake prizes in their respective classes if they thought fit.

It was also resolved that that the Prince of Wales' prize of $60 be given to Clydesdales this year.

It was resolved that the ruling of the Clydesdale Association as to definition of a Canadian Bred Clyde be taken viz: A horse or mare that does not trace on the side of its dam to an imported mare.

Resolved that Messrs. R. Miller, R. Graham and H. Wade be a committee to solicit subscriptions and special prizes in Toronto and elsewhere, with power to place said prizes and subscriptions where they think advisable.

The Secretary, H. Wade, and President Wm. Smith, M.P., were appointed to wait on the Mayor, to see if the city would fit up the drill shed with seats and platform.

The judges recommended were as follows:—Clydesdales—E. W. Charlton, Duncrief; John Morrison, Brooklin; Samuel Staples, Ida; Thos. Good, Richmond East; J. Vipound Brooklin, and R. Gibson, Delaware. Light Horses—Wm. Christie, Toronto; T. D. Hodgins, London; Asa Choate, Port Hope; Harry Winch, Peterborough; Robert Jackson, Arva.

The following is the Catalogue of Premiums given at the Provincial Spring Stallion Show under the management of Agriculture and Arts Association of Ontario and Clydesdale Horse and Shire Horse Associations, held on Wednesday and Thursday, March 11th and 12th, 1891, in the Drill-shed, Toronto:

CLASS I.

SEC. 1.—*Thoroughbred Stallions, foaled previous to January 1st, 1888.*

1st prize, $30; 2nd, $25; 3rd, $15; 4th, $10; 5th, highly commended; 6th, commended.

The prizes were awarded as follows:

1st prize, A. B. Tisdale, Brantford, Ont., Mikado (Vol. 5 Bruce's S.B.); foaled 1881. Bred by Colone Withers, New Jersey, U S.; sire, King Ernest (imp.); dam, Mimi, by Eclipse (imp.), etc.

2nd prize, F. A. Campbell, V.S., Toronto, Ont., Billetto (Vol. 4 Bruce's S.B.), bay; foaled in 1884. Bred by Klein and Woodhurst, Ky., U.S.; sire, Billet; dam, Calomel, by Canwell (imp.), etc.

3rd prize, John Gilkinson, Orangeville, Ont., Anitrino (imp.) (353); brown, stripe on face, one fore foot white; foaled in 1885. Bred by J. C. Murphy, County Kildare, Ireland; imported in 1889 by and the property of exhibitor; sire, Sheldrake or Mackintosh; dam, Cock-a-Hoop, by Gunboat, etc.

4th prize, J. Noble & Co., Owen Sound, Ont., Gascon; sire, Avonties; dam, Arrogance.

5th prize, C. E. Morrison, Toronto, Ont., Old Ireland; bay; foaled in 1887; sire, Ben Battle, or Royal George; dam, Canterbury, by Speculum, etc.

6th prize, George Pepper, Toronto, Ont., Salvator; foaled in 1873; sire, Springbok; dam, Minnock, by Glenelg, etc.

SEC. 2.—*Thoroughbred Stallions, foaled subsequent to January 1st, 1888.*

1st prize, $30; 2nd, $20; 3rd, $10; 4th, $5; 5th, highly commended; 6th, commended.

1st prize, John Gilkinson, Orangeville, Ont., Faughaballagh, *late* Pirate (imp) (351); chestnut, star on face, one hind foot white; foaled in 1888. Bred by Robert Morrison. Ross Connor, County Down, Ireland; imported in 1889 by and the property of exhibitor; sire, Pirate Chief; dam, Lady Stamford, by Salvater, etc.

2nd prize, Thomas Meagher, Doncaster, Ont., Gamble Orr (imp.) (293); bay, one hind foot white; foaled in 1889. Bred by Gamble Orr, Ormonde College Stud, Sydenham, Belfast, Ireland; imported Sept., 1890, by breeder; sire, My Lud; dam, Bee Bird, by Buccaneer, etc.

Sec. 3.—*Sweepstakes, given by Toronto Hunt Club for the best Thoroughbred Stallion, of any age, qualified to improve the breed of Saddle Horses and Hunters.* $25.

F. A. Campbell, V.S., Toronto, Ont., Class I., Sec. 1, Billetto (Vol. 9, Bruce's S.B.).

CLASS II.

Sec. I.—*Carriage or Coach Stallions, foaled previous to January 1st, 1888.*

1st prize, $30 ; 2nd, $25 ; 3rd, $15 ; 4th, $10 ; 5th, highly commended ; 6th, commended.

1st prize, Isaac Hisey, Creemore, Ont., Wild Harry (imp.) [49] (1265) ; bay, black legs ; foaled in 1886. Bred by Henry Coverdale, Hag Farm, Kirby Moorside, Yorkshire, England ; sire, Emperor (1238) ; dam, by Ballot, etc.

2nd prize, William Shields, Toronto, Ont., Barnaby (imp.) 100; bay; foaled May, 1882. Bred in Yorkshire, England ; imported in 1884 by Door Prairie Live Stock Association, Door Prairie, Ind., U.S.; sire, Sportsman (299) ; dam by Champion of England (55), etc.

3rd prize, Robt. Watson, Jr., Varney, Ont., Vidette (21).

4th prize, W. C. Brown, Meadowvale, Ont., King Fairfield [35].

5th prize, Percy & Young, Bowmanville, Ont., Royal Sprague ; seal-brown ; foaled May 10th, 1886. Bred by J. I. Case, Racine, Wis., U.S.; sire, King Sprague ; dam, Alice, by Royal George, etc.

6th prize, W. H. Hutchinson, Toronto, Ont., Igmanthorpe Monarch, 853 ; sire, Statesman (662) ; dam Hawkster Lass (176).

Sec. 2.—*Carriage or Coach Stalllions, foaled subsequent to January 1st, 1888.*

1st prize, $30 ; 2nd, $20 ; 3rd, $10 ; 4th, $5 ; 5th, highly commended ; 6th, commended.

3rd prize, Orlan R. Hall, Bowmanville, Ont., Joe Brown ; bred by exhibitor ; sire, Joe Brown ; dam, Kentucky Belle, by Harper (imp.), etc.

N.B.—Judges did not consider him worthy of a higher prize.

Sec. 3.—*Sweepstakes : For best Coach Stallion of any age, recorded in the Canada Coach Horse Breeders Society of Goderich, Ont.*

1st prize, $30 ; 2nd prize, $20.

1st prize, Isaac Hisey, Creemore, Ont., Class II., Sec. 1. Wild Harry, (imp.) [49] (1265).

2nd prize, Wm. Shields, Toronto, Ont., Class II., Sec. 1. Barnaby (Vol. I. C.C.H.S.B.), 100.

CLASS III.

Sec. 1.—*Roadster Stallions, foaled previous to January 1st, 1888.*

1st prize, $30 ; 2nd, $25 ; 3rd, $15 ; 4th, $10 ; 5th, highly commended ; 6th, commended.

1st prize, S. B. Kaiser, Edmonton, Ont., Cyclone ; bay, star on face, three white feet ; foaled in 1880; sire, Wilkins Micawber ; dam, Lady Morrill, by Young Morrill, etc.

2nd prize, H. G. Charlesworth, Toronto, Ont., Dr. Layton, 2795 ; bay, foaled in 1884. Bred at The Melbourne Stock Farm, Washington, Ill.; sire, Fairy Gift ; dam, Jennie, by Balsora, etc.

3rd prize, H. G. Charlesworth, Toronto, Ont., Honest Wilkes ; bay, black points ; foaled, spring 1887. Bred by Fisk's Stock Farm, Coldwater, Mich., U.S.; sire, Hambletonian Wilkes ; dam, by Mambrino Chief, etc.

4th prize, D. Ferguson & Bros., London, Ont., Moorelight, 9337 ; sire, Twilight, 315 ; dam, Lady Cair, by American Clay, 34, etc.

5th prize, J. A. Proctor, Beaverton, Ont., Julius Cæsar ; dark chestnut, light mane and tail ; foaled May 20th, 1887. Bred by exhibitor ; sire, Veteran ; dam, Maggie May, by Green Mountain, etc.

Sec. 2.—*Roadster Stallions, foaled subsequent to January 1st, 1888.*

1st prize, $30 ; 2nd, $20 ; 3rd, $10 ; 4th, $5 ; 5th, highly commended ; 6th, commended.

1st prize, David J. Adams, Port Perry, Ont., Duke of York ; foaled, April 20th, 1888. Bred by Ward Bros., Utica, Ont.; sire, Jupiter, jr.; dam, Kate Ward, by Master King, etc.

2nd prize, George Arnold, Sutton West, Ont., King Rose, 11914 ; foaled April 9th, 1889 ; sire, Kinsman Wilkes, 6040 ; dam, Rose Hill Maid, by Wedgewood, 692, etc.

Sec. 3.—*Sweepstakes : For best Roadster Stallion, any age, given by the Toronto Electoral District Agricultural Society.* $20.

S. B. Kaiser, Edmonton, Ont., Class III., Sec. 1. Cyclone.

CLASS IV.

Sec. 1.—*Hackney Stallions, of any age.*

1st prize, $25 ; 2nd, $15 ; 3rd, $10 ; 4th, highly commended ; 5th, commended.

1st prize, George Hastings, Toronto, Ont., Young Nobleman (imp.) (2328) ; sire, Confidence (158) dam, by Washington (852) etc.

CLASS V.

Suffolk Punch. No entries.

CLASS VI.

Sec. 1.—*Percheron Stallions, of any age.*

1st prize, $25 ; 2nd, $15 ; 3rd, $10 ; 4th, highly commended ; 5th, commended.

1st prize, Mossom Boyd & Co., Bobcaygeon, Ont., Clovis (imp.) 5346 (6234) ; dark gray ; foaled March 10th, 1883. Bred by M. Sargot, of Pre Commune of Chapelle, Guillaume, Canton of Anthon, Department of Eure-et-Loir, France ; sire, Colin (5723) ; dam, Margot (6233), by La Douceur, etc.

CLASS VII.

Sec. 1.—*Shire Stallions, foaled previous to January 1st, 1888.*

1st prize, $30 ; 2nd, $20 ; 3rd, $15 ; 4th, highly commended ; 5th, commended.

1st prize, S. Hisey & Sons, Creemore, Ont., King Tom, (imp.) [107] ; brown, stripe on face, three white legs ; foaled in 1883. Bred by George Hudson, Cherry Burton, Eng. ; imported Sept., 1884, by John Donkin, Riverview, Ont.; sire, King Tom (2446) ; dam, Topper, by Lincoln, *alias* Hercules (1350), etc.

Sec. 2.—*Shire Stallions, foaled in 1888.*

1st prize, $30 ; 2nd, $20 ; 3rd, $10 ; 4th, highly commended ; 5th, commended.

1st prize, David B. Birrell, Agent, York Mills, Ont., Sizergh Tom (imp.) [219] ; chestnut, stripe on face ; foaled, 1888. Bred by John Blezard, Mill Dam, near Kendal, Westmoreland, Eng.; imported December, 1890, to Toronto by Thomas Gibson, Middleton and Teasdale, Darlington, Eng.; sire, Bank of England (4811) ; dam, Jess (Vol. XI.), by Royalist (2188), etc.

Sec. 3.—*Shire Stallions, foaled subsequent to January 1st, 1889.*

1st prize, $20 ; 2nd, $15 ; 3rd, $10 ; 4th, highly commended ; 5th, commended.

2nd prize, David B. Birrell, Agent, York Mills, Ont., C.A. (imp.) [220] ; bay, stripe on face, hind feet white ; foaled, 1889. Bred by Thomas A. Cook, Chesham House, near Kirkham, Lancashire, Eng.: imported Dec., 1890, by Thomas Gibson, Middleton and Teasdale, Darlington, Eng ; sire, Northern King (2635) ; dam, Nellie, by Marauder (3852), etc.

N.B.—Not considered worthy of first.

Sec. 4.—*Sweepstakes: Given for best Shire Stallion, of any age, by the Shire Horse Association of Canada.* $20.

S. Hisey & Son, Creemore, Ont. Class VII., Sec. 1. King Tom (imp.) [107].

CLASS VIII.

Sec. 1.—*Clydesdale Stallions, foaled previous to 1st January, 1888.*

1st prize, Prince of Wales Premium from Agriculture and Arts Association, $60 ; 2nd, $40 ; 3rd, $25 ; 4th, $15 ; 5th, very highly commended ; 6th, highly commended ; 7th, commended.

1st prize, Graham Bros., Claremont, Ont , Macneilage (imp.) [1117] (2992) ; brown, white face, fore foot and hind foot white ; foaled, June 25th, 1882 ; imported 1889, by exhibitors. Bred by William Gray, Muncraig, Kirkcudbright, Scotland ; sire, Macgregor (1487) ; dam, Jess (1295), by Crown Prince (207), etc.

2nd prize, R. Beith & Co., Bowmanville, Ont , Sir Walter (imp.) [1131] (8272) ; light brown, one fore foot and one hind foot white, stripe on face ; foaled, June 1st, 1886 ; imported 1889, by exhibitors. Bred by James Crawford, Boreland, Castle Douglas, Scotland ; sire, Bold Maghie (4259) ; dam, Jean of Boreland, by Zulu, etc.

3rd prize, Robt. Miller, Jr., Brougham, Ont., Sir Edward (imp.) [1260] (8252) ; bay, white hairs sprinkled through body, little white on hind feet ; foaled, June, 1887. Bred by John Sloan, Alton, Albany, Barr, Scotland ; imported August, 1889, by exhibitor ; sire, St. Blaise (3987) ; dam Jess of Barnhill (9090), by Old Times (579), etc.

4th prize, Graham Bros., Claremont, Ont., Mackechnie (imp.) [1424] (7011) ; brown, stripe on face, near fore leg and hind legs white ; foaled May 17th, 1887. Bred by William Nicholson, Bombie, Kirkcudbright, Scotland ; imported in 1890, by exhibitors ; sire, Macgregor (1487) ; dam, Nannie of Bombie (6569), by Lothian Chief (503), etc.

5th prize, R. Beith & Co., Bowmanville, Ont., Eastfield Laddie (imp.) [1127] (6719) ; bay, white stripe on face, hind feet and part of legs white, near fore foot white ; foaled May 2nd, 1887 ; imported 1889, by exhibitors. Bred by William Maxwell, Baraskomel, Campbelltown, Scotland ; sire, Old Times (579) ; dam, Mary of Baraskomel (4884), by Richard III. (1802), etc.

6th prize, T. W. Evans, Yelverton, Ont., Royal Salute (imp.) [1596] (6246) ; brown, ratch on face, three white legs ; foaled June, 1886. Bred by J. Wilson, Freugh, Stoneykirk, Scotland ; imported July, 1890, by exhibitor ; sire, Darnley (222) ; dam, Nannie (6867), by Lord Lyon (489), etc.

7th prize, R. Beith & Co., Bowmanville, Ont., Renfrew Gallant (imp.) [1315] (8187) ; dark brown, stripe on face, three white feet ; foaled July, 1886. Bred by William Crawford, Chapel, Kilmalcolm, Scotland; imported August, 1889, by exhibitors ; sire, Jordanshaw (3343) ; dam, Maggie (1151), by Lord Clyde, *alias* Quachag Horse (2365), etc.

Sec. 2.—*Clydesdale Stallions, foaled in 1888.*

1st prize, $50 ; 2nd, $30 ; 3rd, $20 ; 4th, $10 ; 5th, very highly commended ; 6th, highly commended ; 7th, commended.

1st prize, John Davidson, Ashburn, Ont., Lewie Gordon (imp.) [1602] (7918) ; brown, blaze on face, hind feet white, near fore leg white ; foaled May 17th, 1888. Bred by Thomas Garland, Ardlethan, Ellon, Scotland ; imported in 1889 by D. & O. Sorby, Guelph, Ont.; sire, MacCamon (3818) ; dam, Kate of Ardlethan (4629), by Earl of Buchan (1126), etc.

2nd prize, Graham Bros., Claremont, Ont. ; Energy (imp.) [1432] (7691) ; bay, stripe on face, hind legs white ; foaled July 1st, 1888. Bred by William Hood, Chapelton, Borgue, Kirkcudbright, Scotland ; imported in August, 1889 by exhibitors ; sire, Macgregor (1487) ; dam, Rosie (543), by Pride of Kilbride (660), etc.

3rd prize, Graham Bros., Claremont, Ont., Crosby Gallant (imp.) [1572] (7618) ; bay, irregular blaze on face, hind feet white ; foaled May 18th, 1888. Bred by Richard Hodgson, Midtown, Burgh-by-Sands, Scotland ; imported August, 1890, by exhibitors ; sire, Lord Lothian (5998) ; dam, Fanny (3591), by Sir Walter (795), etc.

4th prize, Graham Bros., Claremont, Ont., Crosby Chief (imp.) [1574] (7616) ; bay, white face and legs ; foaled June 26th, 1888. Bred by R. B. Brockbank, Crosby, Maryport, Scotland ; imported in August, 1890 by exhibitors ; sire, Barcheskie (4827) ; dam, Maid of the Mist, *alias* Smiler (2948), by Prince of Kirkbean (1269), etc.

5th prize, T. W. Evans, Yelverton, Ont., Rustic Lad (imp.) [1599] (8218) ; bay, white face and hind legs, off fore foot and outside of leg black ; foaled May 19th, 1888. Bred by M. Taylor, Auchendolly, Dalbeattie, Scotland ; imported July, 1890, by exhibitor ; sire, Knight of Lothian (4489) ; dam, Jess of Auchendolly (7885), by Galloway Lad (3617), etc.

6th prize, Graham Bros., Claremont, Ont., Fashion's A (imp.) [1573] (8622) ; bay, irregular stripe on face, off fore foot and hind feet white ; foaled May 25th, 1888. Bred by John Gray, M.R.C.V.S., Tongue, Torbolton, Scotland ; imported in August, 1890, by exhibitors ; sire, Laird Darnley (3748) ; dam, Bella of Tongue (5430), by Pride Junior (1249), etc.

7th prize, Graham Bros., Claremont, Ont., Arbitrator (imp.) [1124] (7430) ; bay ; foaled June 15th, 1888. Bred by George Somers, Bogton Drum, Aberdeenshire, Scotland ; imported in August, 1889, by exhibitors ; sire, Walwin (3284) ; dam, Belle, late Hawkie, by Hawkhead, by Prince of Wales (673), etc.

SEC. 3.—*Clydesdale Stallions, foaled subsequent to January 1st, 1889.*

1st prize, $35 ; 2nd, $25 ; 3rd, $15 ; 4th, $10 ; 5th, very highly commended ; 6th, highly commended ; 7th, commended.

1st prize, D. and O. Sorby, Guelph, Ont., Balgreggan Hero (imp.) [1591] (8446) ; light bay, stripe on face, hind feet white ; foaled in 1889. Bred by John Milroy, Balgreggan Mains, Sandhead, Scotland ; imported in 1890 by exhibitors.

2nd prize, Alex. Russell, Unionville, Ont., Druid's Heir (imp.) [1611] (8587) ; bay, little white on face, hind feet white ; foaled June 1st, 1889 Bred by George H. Duffus, Backpark, Premney, Aberdeenshire, Scotland : imported in 1890, by exhibitor ; Druid Chief (2061) ; dam, Young Darling (8316), by Lord Clyde (1741), etc.

3rd prize, D. & O. Sorby, Guelph, Ont., Prince of Eyre [1532] ; bay, white face, nigh hind leg white, fore feet white ; foaled May 23rd, 1889. Bred by exhibitors ; sire, Roydston Roy (imp.) [216] 1872 (111) ; dam, Jane Eyre (imp.) [217], by Prince of Kilbride (661), etc.

4th prize, Graham Bros., Claremont, Ont., Tinto (imp.) [1575] (9064) ; light bay, narrow stripe on face, foaled May, 1889. Bred by Andrew Montgomery, Netherhall, Castle Douglas, Scotland ; imported Aug., 1890, by exhibitors ; sire, Craigisla (imp.) [1422] (6641) ; dam, Lovely II., of Borehead (262), by Lochfergus Champion (449), etc.

5th prize, D. & O. Sorby, Guelph, Ont., MacNab's Heir (imp.) [1590] (8825) ; dark brown, star on face, spot on nose, one hind foot white ; foaled in 1889. Bred by William Innes, Oldtown, Elgin, Scotland ; imported in 1890 by exhibitors ; sire, MacNab (3824) ; dam, Love, by Earl of Rothes (1128), etc.

SEC. 4—*Sweepstakes : Gold Medal by Industrial Exhibition Association for best Stallion, of any age, shown in this Class.*

Graham Bros., Claremont, Ont., Class VIII., Sec. 1. Macneilage (imp.) [1117] (2992).

CLASS IX.

SEC. 1.—*Canadian-Bred Clydesdale Stallions, foaled previous to January 1st, 1889.*

1st prize, $35 ; 2nd, $25 ; 3rd, $15 ; 4th, $10 ; 5th, very highly commended ; 6th, highly commended ; 7th, commended.

1st prize, P. Kelly, Jr., Brechin, Ont., Pride of Dollar [962] ; bay, stripe on face, nigh hind foot white ; foaled May 6th, 1887. Bred by William Cox, Thornhill, Ont. ; sire, Pride of Perth (imp.) [282] 2264 (2336) ; dam, Sally of Thornhill [328], by Sir Wm. Wallace (imp.) [123] 1, etc.

2nd prize, John & James Boag, Ravenshoe, Ont., Ben Bolt [1326] ; bay, white face, four white feet ; foaled May, 1886. Bred by Edward Atkinson, Brougham, Ont. ; sire, Benmore (imp.) [315] (1948) ; dam, Sally [1199], by Clansman (imp.) [265] 185, 1, etc.

3rd prize, John McPherson, Brougham, Ont., Annan Roy [1339]; bay, star on face, hind feet white; foaled in 1887. Bred by exhibitor; sire, Mount Annan (imp.) [471] (3851); dam, Fan Mac [845], by Joe the Banker (imp.) [125], 75, etc.

4th prize, Ralph Richardson, Peterboro, Ont., Telephone [1158]; brown, little white on face, one hind foot white; foaled April 18th, 1887. Bred by exhibitor; sire, Oliver Twist (imp.) [873] (3043): dam, Julia [1033], by Baron Lenox (imp.) [502] 27 (1576), etc.

5th prize, John G. Goarley, Leesboro', Ont., Lord Wellesley [743]; bay, stripe on face, three white feet; foaled June 3rd, 1884. Bred by Wm. Douglas, Evelyn, Ont.; sire, Wellesley (imp.) [742] (2506); dam, Jennie of Evelyn [566], by Lord Lorne, *alias* Heart of Oak (imp.) [165] 404 (488), etc.

6th prize, Edward Barker, Thornhill, Ont., Topman [944]; bay, white face, four white legs; foaled April 25th, 1887. Bred by exhibitor; sire, Pride of Perth (imp.) [282] 2264 (2336); dam, Kate McCollum [356], by Modern Type (imp.) [25], etc.

At a committee meeting on the first day of the show, it was decided to separate Class IX., Sec. 1, making a separate section for horses foaled in 1888.

SEC. 1½. EXTRA.

1st prize, Barrett Bros., Manchester, Ont., McGinty [1471]; bay, ratch on face, and hind feet white foaled May 20th, 1888. Bred by George Baird, Layton, Ont.; sire, Braehead (imp.) [1470] (3456); dam Dolly Baird [1382], by Dumfriesshire Jock (imp.) [116] (523), etc.

2nd prize, George Davidson & Sons, Cherrywood, Ont., Knight of Cherrywood [1307]; dark bay, stripe on face, hind feet white; foaled April 21st, 1888. Bred by exhibitors; sire, Knight of the Garter (imp.) [1306] (2921); dam, Nancy Roach [1178] by Wait a Wee (imp.) [271] 759 (1549), etc.

3rd prize, William Crawford, Brown's Corners, Ont., Success [1311]; brown, star on face, off hind foot white, little white on nigh hind foot; foaled June 15th, 1888. Bred by exhibitor; sire, Pride of Perth (imp.) [282] 2264 (2336); dam Malvern Jennie [579] 165, by Young Broomfield (imp.) [211] 73, etc.

4th prize, William Cox, Dollar, Ont., Pride of Markham [1416]; bay, star and stripe on face, off hind foot white; foaled May 25th, 1888. Bred by exhibitor; sire, Pride of Perth (imp.) [282] 2264 (2326); dam, Sally of Thornhill [328] by Sir Wm. Wallace (imp.) [123] 1, etc.

5th prize, John McPherson, Brougham, Ont., Brougham Boy [1604]; bay, stripe on face, hind feet white; foaled July 10th, 1888. Bred by exhibitor; sire Mount Annan (imp.) [471] (3851); dam, Fan Mac [845], by Joe the Banker (imp.) [125] 75, etc.

6th prize, David Atcheson, St. Mary's, Ont., Norman MacLeod II. [1549]; dark bay, star on face, hind feet white; foaled May 28th, 1888. Bred by Alex. Atcheson, St Mary's, Ont.; sire, Norman MacLeod (imp.) [926] (3036); dam, Queen of Oxford [1481], by Duke of Edinburgh (imp.) [1047], 337 (1075), etc.

SEC. 2.—*Canadian-Bred Clydesdale Stallions, foaled subsequent to January 1st, 1889.*

1st prize, $25; 2nd, $20; 3rd, $15; 4th, $10; 5th, very highly commended; 6th, highly commended; 7th, Commended.

1st prize, George Davidson & Sons, Cherrywood, Ont., Marmion's Heir [1547]; bay, stripe on face, hind feet white; foaled April 26th, 1889 Bred by exhibitors; sire, Marmion (imp.) [539] (6074); dam Nancy Roach [1178], by Wait a Wee (imp.) [271] 759 (1549), etc.

2nd prize, George Jackson & Son, Downsview, Ont., Bell Boy [1593]; chestnut, stripe on face, off fore foot and hind feet white; foaled May, 1889. Bred by exhibitors; sire, Ross-shire Buff (imp.) [387] (4673); dam, Northlynd Bell [544], by Conqueror (imp.) [310] (202), etc.

3rd prize, John Bone, Edgeley, Ont., Brisbane's Heir [1605]; bay, stripe on face, four white legs; foaled April 12th, 1889. Bred by exhibitor; sire, Brisbane (imp.) [578] (5783); dam, Dandy of Edgeley [620], by Wait on Me (imp.) [55] (283), etc.

SEC. 3.—*Sweepstakes: Gold Medal by Clydesdale Association for best Stallion, of any age, shown in this Class.*

P. Kelly, Jr., Brechin, Ont., No. 3, Class IX., Sec. 1. Pride of Dollar [962].

CONTRIBUTORS TOWARDS PREMIUM LIST OF PROVINCIAL SPRING STALLION SHOW,

(In addition to sweepstakes which appear in prize list.)

Henry Lemon, Clyde Hotel, $20; John Kemp, City Arms Hotel, $20; G. R. Renfrew & Co., Furriers, 71 King St. East, $15; the Queen's Hotel, $10; the Walker House, $10; Alfred Oxford, Black Horse Hotel, $10; Robt. Davies, Esq., $10; R. Bond, Esq., $10; Keachie & Co., English Chop House, $5; H. Russell, Schiller House, $5; McGuire & Kean, Nipissing Hotel, $5; J. A. Simmers, Seed Store, $5; Steele Bros. Seed Co., $5; George Keith, Seedsman, $5; Rennie Bros. Seedsmen, $5.

COUNCIL MEETING HELD JUNE 24TH, 1891.

The chair was occupied by the President, R. Vance, and the following members were also present: Messrs. Awrey, Morgan, Legge, Simmons, Rawlings, Macpherson, Sissons, Dawson, Rykert, Rowand, Haggerty and Snell.

The SECRETARY read the minutes of the previous meeting, which, on motion of Mr. Rowand, seconded by Mr. Awrey, were confirmed.

The following communications were read by the Secretary, addressed to him:

DEAR SIR,—I am requested by the Eramosa Plowing Society to ask that your Board sanction the holding of the Provincial Plowing Match in connection with their Association, and on this farm.

I feel safe in saying that we can furnish a field that will be suitable for this purpose, and will very gladly do anything that is likely to make the match a success.

Hoping to hear from you in due time in reference to this matter,

I am, yours truly,

THOMAS SHAW.

This was referred to the Plowing Match Committee for the district, Messrs. Rykert, Dawson and Awrey.

A communication was received from Mr. Wm. Cunningham, of the Dominion Live Stock Association, enclosing the following resolution:

"*Resolved*, that this Association request the Agriculture and Arts Association of Ontario to establish a fat stock show similar to that held annually in Chicago, and that it be held in the City of Toronto early in December of each year, and that a copy of this resolution be forwarded to the Secretary of the Agriculture and Arts Association."

A list of farms entered for competition in group No. 5 was then read, which showed that a great many townships had not made any entries.

Mr. RAWLINGS thought a great many farmers were not reached by the circulars sent to the township and electoral district societies, and that advertisements be sent to the county papers in the group.

Mr. SIMMONS thought that expenses could be lessened by giving the medals to the county societies to distribute.

It was resolved that where but one farm was entered in a township only gold or silver medals could be competed for, or, in other words, it could only compete for the county prizes.

A deputation from the Dominion Live Stock Association, consisting of Messrs. C. Flanaghan, Toronto; A. Eaken, Springfield on the Credit, and Mr. Bickerdike, Montreal, were introduced.

Mr. FLANAGHAN, Vice-President, spoke in favor of holding a fat stock show every year early in December, or just before Easter, at the time of the horse show. If this suggestion was carried out by the Council of Agriculture, their Association would use their influence with the City Council and the Ontario Government, and give any other assistance in their power.

Mr. Eaken and Mr. Bickerdike spoke on the same lines as the Vice-President.

R. Vance, President, thanked the deputation in a courteous manner, and said he was satisfied they would be of great assistance to the Council.

N. Awrey suggested Hamilton as a proper place to hold such a show, as he was sure they would try and give the assistance and accommodation required.

Mr. Sissons thought Toronto was the proper place to hold this show, but if proper accommodation could not be secured, then Hamilton, or any other place that could supply accommodation should get it.

D. M. Macpherson said he was in favor of the show, and that it should be permanent, Canada's live stock trade being of sufficient importance.

H. Wade, the Secretary, said the Council must bear in mind that this show was already established, and up to the present date had held or assisted seven annual ones, held under difficulties as to accommodation. Notwithstanding having to move from post to pillar, they had all been successes and worth encouraging. This deputation would give the Council new heart as to continuing this show, although at the present day they were no better off as far as accommodation is concerned than they were seven years ago.

Moved by D. M. Macpherson, seconded by Joshua Legge, "That the following committee be appointed to meet a committee from the Dominion Live Stock Association to act jointly in the direction of securing the best means of obtaining accommodation for the holding of an annual fat stock show in Toronto, viz: Messrs. Awrey, Rawlings, Rykert, Snell, Simmons and Morgan." Carried.

The Committee on Plowing Matches reported that the match for sections 7, 8 and 9 be held at the Experimental Farm at Guelph; for sections 10, 11, 12 and 13 be held in North Essex; sections 1, 2 and 3 were left for Messrs. Macpherson, Legge and Morgan to decide the place; sections 4, 5 and 6 to the decision of Messrs. Snell, Haggarty and Vance.

The question of selling the present building and purchasing a building where stock shows might be held was considered, and the Council adjourned for an hour to visit the Mutual Street Rink. They then decided that it would not be advisable to make the change at present.

Moved by Mr. Awrey, seconded by Mr. Snell:

"That whereas committees have been appointed by the different Stock Associations of the Province of Ontario to confer with the committee appointed by this Association to consider what steps should be taken to procure an exhibit of stock and all other products of this Province at the Columbian Exhibition, to be held in Chicago.

"Be it therefore resolved that this Board empower the Secretary to notify these different Associations of our willingness to co-operate with them for the above purposes, and that he arrange for a joint meeting to consider what line of action should be adopted to carry out the desired object of making the Ontario exhibit worthy of this Province; and also, that a committee be appointed to interview the Dominion Government for the purpose of ascertaining whether the same liberal assistance will be granted as in the case of the Centennial Exhibition, Philadelphia, and that the said committee be composed of the following members of this Council: The President, Messrs. Morgan, Rykert, Rowand, Macpherson, Legge, and the Secretary, with instructions to report the result of their mission to the World's Fair Committee of this Association at as early date as convenient." Carried.

Moved by D. M. Macpherson, seconded by J. Haggerty:

"That inasmuch as the deputation from the Dominion Live Stock Association appeared before the sitting Council of the Agriculture and Arts Association, asking that an annual and permanent live stock exhibition be held in the city of Toronto in the fall or spring of each year; the object and aim of such an exhibition be similar to the Chicago Fat Stock Show; this show to be held in this city, providing the accommodation can be furnished. Be it hereby resolved that this Council approve of the objects and desires of said delegation, and that the Council heartily endorse their views, and will do all in their power to promote the successful carrying out of the same."

On motion, Mr. Morgan's name was added to the World's Columbian Exposition Committee.

It was resolved that the committee, consisting of President Vance, James Rowand, M.P. Joshua Legge, Ira Morgan and H. Wade, Secretary, visit Ottawa on July 3rd, to wait on the Hon. John Carling *re* assistance to the World's Fair.

The meeting then adjourned.

WORLD'S COLUMBIAN EXPOSITION COMMITTEE SEPT. 17, 1891.

This Committee, consisting of delegates from the Dominion Short Horn Breeders', Sheep and Swine Breeders' Associations, met to confer with the Agriculture and Arts Association committee *re* working up exhibit for Chicago in 1893.

Present—From Agriculture and Arts Asssociation Messrs. Awrey, Morgan, Snell, and Wade; from Short Horn Breeders' Association, Richard Gibson and James Russell; from Sheep Breeders' Association J. Jackson and John McGillivray; from Swine Breeders' Association, F. W. Hodson. John Weld represented *Farmer's Advocate* and Francis Green, jr., the *Live Stock Journal.* N. Awrey, M. P. P., was selected chairman, and H. Wade Secretary.

The Committee appointed at the last meeting of the Council of Agriculture on June 24 to wait on the Hon. John Carling, Minister of Agriculture for the Dominion, reported the result of their conference with him, by the Secretary reading the result as published in the Ottawa paper of the day.

A deputation composed of Messrs. Fairbairn, M.P., Victoria South; Davidson, M.P., Ontario East; Featherston, M.P., Peel; T. D. Craig, and Beith, M.P., with the following members of the Agriculture and Arts Association: Messrs. R. Vance, president; Rowand, M.P.; Ira Morgan, H. Wade and Joshua Legge, waited upon the Minister of Agriculture in the morning, to ascertain whether the Government would afford any assistance to Ontario producers and manufacturers exhibiting at the World's Fair, Chicago, in the shape of facilities of free transit of exhibits or otherwise.

Mr. Vance acted as spokesman for the deputation and asked that the Dominion Government pay the transport of Live Stock and other Agricultural and Industrial exhibits to and from Chicago and the maintenance while there of a selected number of stock as had been done in 1876 when exhibits were sent to the Centennial at Philadelphia.

Mr. Carling replied favorably. He said the official invitation had been received by the Government from the President of the United States, and that he had little doubt that the request of the deputation would be granted.

DATES FOR EXHIBITING LIVE STOCK AT CHICAGO.

The Live Stock Exhibit will begin August 24th, and close October 30th, 1893.

The period devoted to the exhibition of animals for award in different divisions of Live Stock, at the World's Columbian Exposition, will be as follows:

A. CATTLE—September 11th to September 27th.
B. HORSES, JACKS AND JENNETS—August 24th to September 6th.
C. }
D. } SHEEP AND SWINE—October 2nd to October 14th.
E. DOGS—June 12th to June 17th.
F. POULTRY, Pigeons, and Pet Stock, October 18th to October 30th.

These dates affect the judging, and all Live Stock have to be on the grounds from Aug. 24th to Oct. 30th.

Mr. AWREY said he would like to have the opinion of the Stock Breeders present as to sending a deputation composed of representatives of all the Stock Breeders' Associations, to interview the Dominion and Ontario Governments regarding the selection of the stock to be exhibited and other details. To make their exhibit a success the Governments ought to relieve the exhibitors of all expense such as maintenance, transportation, etc.

F. W. Hodson said that this was a great International Fair, and it would be a great means of advertising the country, and the Governments should bear the expense.

Mr. Awrey said that the Dominion Government should bear the expense of maintenance and transportation of the stock and exhibitors, and the Ontario Government should pay the expenses for selecting the Ontario exhibit.

Richard Gibson thought that besides the selecting the Ontario Government should duplicate the prizes. The National Committee had awarded $150,000 in cash prizes, for the Live Stock, to be competed for by all exhibitors, but several States had supplemented this by giving large grants for prizes of exhibits from those States only. Now that the Ontario Government did not give a grant to the Provincial Fair, he thought they should contribute money prizes for competition among Ontario exhibitors at the World's Fair.

John Jackson said that the stock breeders should be made sure of something, and he thought the Ontario Government should grant a sum of money for this purpose. Cash was wanted, not medals.

The meeting thought that the Agriculture and Arts Association should make the selection of the Ontario stock and give the prizes, and not a committee composed of representatives of the various Stock Breeders' Associations.

Mr. Awrey warned the stock breeders, that the people in the United States, especially those of Illinois, which is the greatest rival of the Province of Ontario for stock breeding, would be purchasing choice cattle for the purpose of exhibiting them at the World's Fair. He advised them not to sell their best stock, and then exhibit inferior cattle against them. If Canadians kept their best stock they would be successful in competition against all others exhibiting, and the breeders' in the States would recognise Ontario as the best stock raising part of the continent and come here to purchase. If, however, Illinois stock breeders succeeded in buying the best stock in Ontario the other States would look upon Illinois as the place where the best cattle could be purchased, thus making a great loss to this Province. Breeders here must be convinced that sufficient inducements will be given them by the Dominion and Ontario Governments to keep their best stock to ow at Chicago.

It was resolved upon motion of John McGillivray, seconded by J. C Snell, That in order that the Dominion of Canada, and this the premier province of the Dominion, should be properly represented at the approaching World's Fair to be held at Chicago in 1893, in the matter of all its industries, the Federal Government be urged to make an appropriation for defraying the expenses of transportation of of all exhibits, the cost of keeping the live stock, and the necessary personal expenses of exhibitors, and those in charge of the exhibits while upon exhibition and while going to and returning therefrom; and further that the Government of our own Province be asked to make a sufficient appropriation for the purpose of bearing the expenses of selecting the stock, and other products to be exhibited and for prizes to be awarded to Ontario exhibitors thereat. It was also resolved that a committee be appointed to work out the necessary detail as to the line of action to be adopted, the selection of stock and management of exhibits and the cost thereof, and submit their report at as early a date as possible to the Departments of Agriculture of both the Dominion and Ontario Governments for their approval or rejection, the said committee to be composed of Messrs. Awrey, Gibson, McGillivray, Snell, Jackson, Morgan, Hodson, and Wade. The Secretary was requested to secure all information that will enable the committee to arrive at a proper decision. Mr. Awrey was appointed chairman and Mr. Wade secretary of the said committee.

STOCK SHOW COMMITTEE.

Toronto, Nov. 6th, 1891, 2 o'clock, p.m.

Minutes of meeting of Stock Show committee called at this date.

Members present R. Vance, President; C. M. Simmons, J. C. Snell, A. Rawlings J. Legge, N. Awrey and H. Wade, Secretary.

The Secretary explained that according to instructions he had written to the Secretary of the Dominion Live Stock Association as to this meeting and had received the following answer.

OFFICE OF THE DOMINION LIVE STOCK ASSOCIATION.

Montreal, Oct. 27th, 1891.

DEAR SIR,—I have sent your letter to Mr. Flanagan, Vice President of this Association, in Toronto, requesting him to arrange for a deputation, to be present at your next meeting, in connection with the Fat Stock Show.

Yours truly,

WM. CUNNINGHAM.

The Secretary also read the following letter:

Guelph, Sept. 12th 1891.

DEAR SIR,—At a meeting of the Guelph Fat Stock Club held to-day I was instructed by the Board to request that the "Agriculture and Arts Association" would appropriate a number of prizes for the various classes of Fat Stock at the Christmas show in December next. The amount for *prizes* and *classes* to be placed as the Association deems most suitable.

As the Association has dealt liberally with the Club in former years it is to be hoped that it will still further continue its assistance to make the Guelph Christmas Show a decided success.

Yours respectfully,

JNO. MCCORKINDALE
Sec.

A delegation from the Dominion Live Stock Association consisting of John Dunn, W. Crawford, A. Eaken, John Flanagan and ex-Ald. Frankland, waited on the meeting to assist in getting up a Spring Show.

Mr. FRANKLAND explained that Mr. Grand would allow his stables to be used free of charge for a Christmas Show, also that the Mutual Street rink can be purchased for a moderate sum, which would give plenty of room.

The other gentlemen of the deputation with the exception of Mr. Dunn, expressed themselves in favor of a mixed horse and cattle show in the month of March.

Moved by Mr. AWREY, seconded by Mr. SNELL, "That after consultation with a delegation from the Dominion Live Stock Association, this Committee is of of opinion that the generous offer of Mr. Grand, offering the use of his buildings comes at so late a date in the season as to preclude the possibility of holding a Fat Stock Show in the City of Toronto this season, and in view of the want of suitable buildings for holding a general stock show in the spring, be it resolved that joint action be taken with Fat Stock Club of Guelph in holding an exhibition in that city, and further that in the opinion of this committee co-operation be asked from the Dominion Live Stock Association in arranging for a general stock show in the spring of 1893."

Moved by Mr. LEGGE, seconded by Mr. SIMMONS, "That after listening to ex-Alderman Frankland's remarks in reference to the purchase of a suitable building by the Province and City for the purpose of holding stock shows and having an Agricultural Hall where farmers might congregate, it be resolved that the thanks of the Board be tendered to Mr. Frankland for his interest in all that pertains to agricultural pursuits, and to express the opinion that his suggestions are worthy of the favorable consideration of both the Provincial and City authorities.

Moved by Mr. AWREY, seconded by Mr. SNELL, "That a sum not to exceed $300 be granted to hold a joint Fat Stock Show in Guelph, subject to the same conditions attached to the agreement for amalgamation in the year 1890, and that the following be a committee to visit Guelph and arrange the prize list via: if Messrs. Simmons. Rawlings and Wade." Carried.

The Secretary then read invitations from the city of Kingston, the Midland Central Fair Association and the County of Frontenac Agricultural Society, to hold the Provincial Exhibition in the City of Kingston in 1892 to select work for the coming World's Fair.

Moved by Mr. LEGGE, seconded by Mr. RAWLINGS, "That in reference to the invitation of the City of Kingston, the Midland Fair Association and the County of Frontenac Agricultural Society, to the Agriculture and Arts Association to hold a Provincial Exhibition at Kingston in 1892 at which selections of stock and other exhibits for the Columbian Exhibition at Chicago in 1893 could be made, this committee records its pleasure at the reception of such a proposition and recommends that the corporation of the City of Kingston lay before the Council of the Agriculture and Arts Association at its next meeting assurances that in case their proposition is accepted all necessary buildings and accommodations for the holding of such Exhibition will be provided by the city, and that the secretary be instructed to notify the City Council of the City of Kingston of the time and place of the next meeting of this Council."—Carried.

FAT STOCK SHOW AT GUELPH.

A meeting of the Guelph Fat Stock Club with a deputation from the Agriculture and Arts Association, was held in the Council Room, City of Guelph, on Saturday, Nov. 7, James Miller, President, in the chair.

Members present: W. McCrae, R. Buchanan, W. Laing, R. Irving, J. Tyson, G. Whitelaw, A. Hales, T. Waters, Jas. Taylor, H. Wright, W. West, Prof. Shaw, O.A.C., and Jas. Anderson. H. Wade, C. M. Simmons and A. Rawlings, a delegation from the Agriculture and Arts Association, were present.

A deputation from the Guelph City Council consisiting of Mayor Goldie, Aldermen Hewer and Reid were also present.

Mr. WADE said that the Agriculture and Arts Association was prepared to grant $300 to the Christmas Show to be held in Guelph on the same terms as in 1890.

Moved by WM. MCCRAE, seconded by G. WHITELAW, that the offer of the Agriculture and Arts Association to amalgamate with the G.F.S. Club, to hold a Christmas Show in Guelph on the same terms as 1890 be accepted.

Moved by WM. MCCRAE, seconded by G. WHITELAW, that C. M. Simmons be President of the Joint Board.

Moved by A. RAWLINGS, seconded by WM. MCCRAE, that Jas. Millar be Vice-President.

Moved by JAS. MILLAR, seconded by T. WATERS, that H. Wade be Secretary.

Moved by T. WATERS, seconded by JAS. TAYLOR, that John McCorkindale be Treasurer.

Moved by JAS. MILLAR, seconded by W. LAING, that H. Wright be Superintendent.

Moved by JAS. MILLAR, seconded by W. WEST, that the Committee from the City Council, viz: Mayor Goldie, Aldermen Hewer, Reid and Barber be added to the list of directors of the Fat Stock Show.

Moved by WM. MCCRAE, seconded by T. WATERS, that the Vice-President, Mayor Goldie, Ald. Hewer, Prof. Shaw, H. Wright and Jas. Taylor, be a committee to wait upon the stock-holders of the Skating Rink Co. to make every effort to procure the rink for the purpose of holding the Christmas Show.

The prize list was then revised and rules and regulations adopted.

The following Committees were made for the different classes:

For CATTLE.—A. Rawlings, Prof. Shaw, L. O. Barber, Jas. Taylor, W. West, G Whitelaw.

For SHEEP.—President Mills, O. A. C., T. Waters, A. Hales, R. Buchanan, W. R. Elliott.

For HOGS.—J. C. Snell, W. McCrae, Geo. Taylor, R. Irving.

For POULTRY.—Jas. Anderson, W. Laing.

WORLD'S FAIR COMMITTEE, TORONTO, NOV. 25TH, 1891.

A meeting of the World's Fair Committee of the Agriculture and Arts Association was held yesterday afternoon. The following members were present:—N. Awrey, Binbrook; A. Rawlings, Forest; R. Vance, Ida; J. C. Snell, Edmonton; Ira Morgan, Metcalfe; F. W. Hodson, London, Hog Breeders' Association; Richard Gibson, Delaware Shorthorn Association; J. Jackson, Abingdon Sheep Breeders' Association. Mr. Awrey was in the chair. The following resolution was adopted:

Whereas the World's Columbian Exhibition, to be held in Chicago in 1893, will in all probability be the greatest aggregation of live stock and agricultural products that has ever been brought together on the American Continent, it is of the utmost importance to this Province that a good representation of its products should be made on that occasion. The selection of Chicago, the greatest live stock emporium of the world, as the place for holding the exhibition is one especially favorable to the interests of Canadian stockmen, as the demand for our improved stock is mainly from the great Western States and Territories, and in making preparations to exhibit at Chicago our stockmen will be taking their stock right into its natural market. Canada has long been, and is likely to be in the future, the principal breeding ground to which the farmers and breeders of the United States look for first-class animals to replenish their herds and flocks, and this exhibition will afford an opportunity which may not occur again in a century to demonstrate to the world the facilities of this country to produce animals of the highest merit as to breeding quality and vigor of constitution, as well as our ability to exhibit in all departments products unrivalled for excellence; be it therefore resolved, that in order to carry our effort to a successful issue, the following recommendation be adopted:

1. That the Dominion Government be asked to provide all expenditures in connection with the transportation, care, and maintenance of all the exhibits from the time of shipping until the return of same.

2. That the Dominion Government be asked to provide for the insurance of the live stock from time of shipment to return.

3. That the Ontario Government be asked to appoint a provincial commissioner, who shall devote his attention to securing a complete exhibit in every department, and who shall represent the Province at Chicago.

4. That the Ontario Government be asked to appropriate at least nineteen thousand dollars to be offered as prizes to live stock from this Province, the above sum to be divided amongst the various classes in the same proportion as at the last Provincial Exhibition, as nearly as may be in conformity with the classification of the Columbia Exhibition.

5. That the Ontario Government be asked to confirm the appointment of a sub-commissioner selected by this board, one for each of the following classes, viz: Horses, cattle, sheep, hogs, agricultural products, horticultural products, and the dairy, who shall select the exhibits to represent their various departments, said sub-commissioners to be selected from this board or some of the existing live stock associations, all expenses incurred by the sub-commissioners in their duties to be paid by the Ontario Government.

6. All entries to be made to the Secretary of the Agriculture and Arts Association on forms provided for the purpose.

The amounts considered sufficient for Live Stock Prizes were as follows: Horses $7,300, Cattle $7,000, Sheep $2,500, Swine $2,200. Total $19,000.

ROYAL HOTEL, GUELPH, December 9th, 1891.

The World's Fair Committee of the Agriculture and Arts Association, together with representatives of the various Stock Breeders' Associations, met at eleven o'clock in the forenoon. The following were present: Nicholas Awrey, M.P.P., Binbrook, Chairman; R. Gibson, Delaware; A. Rawlings, Forest; R. Vance, Ida; J. C. Snell, Edmonton; Ira Morgan, Metcalfe; F. W. Hodson, London; J. Featherstone, M.P., Streetsville; J. C. Rykert, St. Catharines; J. Jackson, Abingdon; Henry Wade, Toronto, Secretary.

Minutes of former meeting were read and confirmed.

The following letter was read by the Secretary:

CHICAGO, Ill., Sept. 28, 1891.

Henry Wade, Esq., Secretary

DEAR SIR,—Yours of the 25th instant at hand. The acting chief of the live stock department of the World's Columbian Exposition has issued at least a partial prize list for the live stock, reserving the right to change or amend the same. In other words, there are nineteen thousand dollars retained for new classes or additions to the present, as the chief may decide after he is appointed. I will mail you a copy of the same; and the first opportunity I have of calling at the office I will have them mail you some more.

Of course there is no state, district or nation known in the competition at the Exposition. That is, all Short-horns will compete for the prizes, no matter where they come from, and all other breeds of cattle or horses the same. The State of Illinois has made a separate appropriation for the encouragement of an exhibit of this State alone. They have appointed a commission, but the matter has not been considered, so that I do not know in what shape the "encouragement" will be applied. I have made some suggestions which will be published in this week's *Gazette*, but I do not know that they will be adopted. I presume the same will apply to all the national associations that have offered prizes. At all events, I know that there is no limit to the six thousand dollars voted by the American Short-Horn Breeders' Association; the prize is intended to be paid to the best without regard to where they may come from. In the "battle of the breeds," the location and the breeder, to a certain extent, is lost sight of. No matter who may have bred the Short-horn or what country it comes from, we want it on exhibition here so that it can be a champion against comers of all other breeds.

At any time that I can serve you, in this or in any other way, please remember that I am subject to your command.

Yours truly,
J. H. PICKRELL.

CHICAGO, Ill., Nov. 4, 1891.

DEAR SIR,—I have the honor to acknowledge the receipt of your letter of the 31st ult. relative to the omission by this Department of certain records touching the question of the eligibility of animals for entry at the Exposition, and note what you say in support of the proposition of admitting such records.

The subject as it broadens out is one that will be very carefully considered by myself before the next edition of the Live Stock Rules and Regulations are printed, in which edition a number of corrections will be made, and the subject you mention will be given very careful and earnest thought.

I note what you say relative to the interest in Canada in the live stock exhibit, and feel very much gratified at the information.

Very respectfully yours,
W. I. BUCHANAN,
Chief, Department of Agriculture.
(In charge, Dept. of Live Stock.)

P. S.—Kindly have copies of the stud-books and records which you desire to have recognised sent me so that each case may be properly considered. In cases where the books are not in print yet, have the rules sent me, and in each case the correct title of the book. W. I. B.

The secretary submitted prize lists for Ontario live stock in the World's Columbian Exposition in Chicago, 1893, which he had prepared under instructions given at a former meeting of the committee. The prize lists were discussed section by section, and some amendments being made were adopted as follows:

HORSES.

1st. *Thoroughbreds.*

	1st.	2nd.	3rd.	4th.
Best Stallions, 4 years and over	$50 00	$40 00	$30 00	$20 00
3 " under 4	50 00	40 00	30 00	20 00
2 " " 3	50 00	40 00	30 00	20 00
1 " " 2	40 00	30 00	20 00	10 00
Colts, under 1 year	35 00	25 00	15 00	10 00
Best mare, 4 years and over	50 00	40 00	30 00	20 00
3 " under 4	50 00	40 00	30 00	20 00
2 " " 3	50 00	40 00	30 00	20 00
1 " " 2	40 00	30 00	20 00	10 00
Filly, under 1 year	35 00	25 00	15 00	10 00

2nd. *Hackneys.*
3rd. *Coach Horses.* Any kind.
4th. *Clydesdales.*
5th. *Shires.*
6th. *Suffolk Punch.*

The same as for *Thoroughbreds.*

CATTLE.

1st. *Short Horns.*

	1st.	2nd.	3rd.	4th.
Best bull, 3 years and over	$50 00	$35 00	$20 00	$15 00
2 " under 3	50 00	35 00	20 00	15 00
1 " " 2	50 00	35 00	20 00	15 00
Calf, under 1 year	35 00	25 00	15 00	10 00
Best cow, 4 years and over	50 00	35 00	20 00	15 00
3 " under 4	50 00	35 00	20 00	15 00
Heifer, 2 " " 3	40 00	30 00	20 00	15 00
1 " " 2	35 00	25 00	15 00	10 00
Calf, under 1 year	25 00	20 00	15 00	10 00

2nd. *Herefords.*
3rd. *Ayrshires.*

The same as for *Short Horns.*

4th. *Aberdeen Angus.*

	1st.	2nd.	3rd.	4th.
Best bull, 3 years and over	$35 00	$25 00	$15 00	$10 00
2 " under 3	35 00	25 00	15 00	10 00
1 " " 2	35 00	25 00	15 00	10 00
Calf, under 1 year	25 00	20 00	15 00	10 00
Best cow, 4 years and over	35 00	25 00	15 00	10 00
3 " under 4	35 00	25 00	15 00	10 00
2 " " 3	35 00	25 00	15 00	10 00
1 " " 2	25 00	20 00	15 00	10 00
Calf, under 1 year	20 00	15 00	10 00	8 00

5th. *Galloways.*
6th. *Devons.*
7th. *Jerseys.*
8th. *Holsteins.*

The same as for *Aberdeen Angus.*

SHEEP.

1st. *Cotswolds.*

	1st.	2nd.	3rd.
Ram, 3 years and over	$20 00	$15 00	$10 00
2 " under 3	20 00	15 00	10 00
1 " " 2	20 00	15 00	10 00
Lamb, under 1 year	15 00	10 00	5 00
Ewe, 3 years and over	20 00	15 00	10 00
2 " under 3	20 00	15 00	10 00
1 " " 2	20 00	15 00	10 00
Lamb, under 1 year	15 00	10 00	5 00

2nd. *Leicesters.*
3rd. *Lincolns.*
4th. *Southdowns.*
5th. *Shropshires.*
6th. *Oxford Downs.*
7th. *Dorset Horned.*

The same as for *Cotswolds.*

SWINE.

1st. *Berkshires.*

	1st.	2nd.	3rd.
Boar, 2 years and over	$20 00	$15 00	$10 00
1 " under 2	20 00	15 00	10 00
6 months and under 1 year	20 00	15 00	10 00
under 6 months	15 00	10 00	6 00
Sow, 2 years and over	20 00	15 00	10 00
1 " under 2	20 00	15 00	10 00
6 months and under 1 year	20 00	15 00	10 00
under 6 months	15 00	10 00	6 00

2nd. *Yorkshires.*
3rd. *Poland Chinas.*
4th. *Chester Whites.*
5th. *Essex Whites.*
6th. *Tamworths.*

The same as for *Berkshires.*

It was moved by R. GIBSON, seconded by J. C. SNELL, that the words "and poultry" be struck out of the resolution passed at the last meeting wherever they occur.—Carried

The chairman called upon Mr. Gibson to give a report concerning his interview with Hon. John Carling, Minister of Agriculture for the Dominion, respecting the World's Fair.

Mr. GIBSON, complying, said : I heard that Mr. Carling was in London and I took the opportunity to meet him. He expressed himself in this way—that until we presented our views to him in definite shape he would not give any understanding as to what the Dominion Government were prepared to do. When we were ready and had arranged what we wanted he would be glad to meet a delegation to learn what was really required of him. He seemed to think it a little premature to talk about the matter now, 1893 being a long time to look forward to. But when I see the cattlemen not only of this continent but of the whole world working hard to get their stock into proper condition, it seems to me, if the men in Ontario are to win prizes, the work must begin at once.

After discussion of the subject it was moved by A. RAWLINGS, seconded by J. JACKSON, that J. C. Rykert, N. Awrey, R. Gibson and R. Vance be a committee to wait upon Hon. Mr. Carling and present to him the wishes of the committee concerning the Dominion Government as set forth in the resolution passed at the last meeting.—Carried.

The committee then adjourned.

MEETING OF COUNCIL.

ROYAL HOTEL, GUELPH, December 9th, 1891.

Members present—Ira Morgan, Metcalfe; Joshua Legge, Gananoque; James Haggerty, West Huntington; Robert Vance, Ida; J. C. Snell, Edmonton; N. Awrey, M.P.P., Binbrook; J. C. Rykert, St. Catharines; William Dawson, Vittoria; James Rowand, M.P., Dunblane; C. M. Simmons, Ivan; Albin Rawlings, Forest; Jonathan Sissons, Crown Hill.

The minutes of last regular meeting were read and confirmed.

The following letters and resolutions were read by the secretary:

KINGSTON, Ont., Oct. 7, 1891.

MY DEAR SIR,—At a meeting of the directors of the Midland Agricultural Association, and of many citizens, held on the afternoon of the 5th, the accompanying resolutions were unanimously passed. Also, at a meeting of the city council on the evening of the 5th, a resolution endorsing the enclosed was passed without a dissenting voice. Now in reply let me know if anything else can be done to make the movement a success.

Faithfully,

R. MEEK.

Moved by W. M. Drennan, seconded by Mr. J. Browne, Whereas steps have been taken by the Agriculture and Arts Association of Ontario and the Breeders' Association conjointly towards having a first-class exhibit of live stock at the World's Fair in 1893.

And whereas it is necessary to have a great aggregation of stock at some point central, easy of access, and providing all needful facilities for the selection of the exhibit for Chicago.

And whereas Kingston is well suited for the display, having good grounds and good railway and steamboat connections.

Resolved that the Agriculture and Arts Association and the Breeders' Association be requested to hold the show here and the Midland Agricultural Association give the use of their property for the purpose.

Moved by Ald. Hardy, seconded by Mr. A. Strachan, that a copy of the resolution of this Association in regard to the Agriculture and Arts Association show, be sent to the Council with the request that it take action thereon.—Carried.

ROBERT MEEK ESQ.

DEAR SIR,—In reply to your communication at the instance of the directors of the Midland Agricultural Association *re* holding the exhibit of the Agriculture and Arts Association of Ontario and the Breeders' Association of Ontario to hold their exhibit at the city of Kingston, 1892.

I have the honor of enclosing a resolution, of which the following is a copy, adopted at the council's meeting on the 5th instant.

On motion of Ald. Hardy, seconded by Ald. Wright,

"Ordered, that the council of the corporation of the city invite the Agriculture and Arts Association of Ontario and the Breeders' Association of Ontario to hold their exhibit at Kingston in 1892."

I am, dear Sir,

Yours very truly,

M. FLANAGAN,
City Clerk.

KINGSTON, November 23rd, 1891.

DEAR SIR,—I am directed by the Mayor to acknowledge the receipt of yours of the 26th ult. *re* invitation to the Agriculture and Arts Association to hold its next exhibition in this city.

You have asked if sufficient accommodation for a Provincial Show be guaranteed.

The finance committee of our council, to which your communication was referred, desire further information as to what more accommodation you require than the Palace and grounds already possess. Since the last Provincial Exhibition was held here many improvements have been made to buildings and grounds, which now possess all the necessary accommodation for a Provincial Exhibition.

Wishing to hear from you on the subject.

I am, dear Sir,
Yours truly,

M. FLANAGAN,
City Clerk.

Moved by Mr. G. S. Oldrieve, seconded by J. B. Walkem, that the county of Frontenac Electoral District Society learns of the proposal to hold a show next year at which to select stock, minerals and other products for the World's Fair at Chicago.

That it joins with the Councils and Agricultural Associations in inviting the Agriculture and Arts Association of Ontario, and Breeders' Association to hold their show here.

That this Association in extending the invitation undertakes to do what it can to make the exhibition, if held here, a success.—*Carried.*

HARROWSMITH, October, 1891.

J. P. ORAN.

DEAR SIR,—In reply to your letter dated October 20th, I can only say in reference to your invitation to the Agriculture and Arts Association and the Breeders' Association to hold a show in Kingston, in A.D. 1892, for the purpose of selecting stock, etc., for the World's Fair to be held in Chicago in A.D. 1893, that your proposition meets with my hearty approval. The scheme is a good one, and the place is the best located in Ontario for that special show, and I think I can assure you that the scheme will meet with the approval of the County Council unanimously.

Yours very truly,

JOS. E WATSON,
Warden of Frontenac.

Mr. LEGGE presented the following petition, signed by almost every member of the Counties' Council, relating to the same subject:

To the Agriculture and Arts Association, Province of Ontario.

GENTLEMEN,—We, the undersigned members of the Counties' Council of the United Counties of Leeds and Grenville, respectfully submit:

1. That the holding of an exhibition in the eastern portion of Ontario has always proved of great benefit to agriculturists and stock owners in this section, by bringing together men and stock from all parts of the Province, and enabling progressive men to conveniently purchase such animals and agricultural products as may be necessary to their business.

2. The suspension of the Provincial Exhibition during the past two years has been a matter of regret to those in this section who are interested in such affairs. And that regret is increased now, when in the regular order of location the exhibition would, if it had been continued, have been held in this vicinity in 1892. There is no other exhibition of sufficient extent or importance east of Toronto to take the place of the Provincial. Consequently, when that is omitted, the whole eastern portion of the Province is left without an exhibition that is general in its relations and advantages.

3. In view of the fact that the World's Fair is to be held in Chicago in 1893, we deem it of the utmost importance that some opportunity of gathering together and selecting exhibits for the World's Fair be afforded. And we know of no better means for securing that end, in so far as eastern Ontario is concerned, than the holding of a Provincial Fair next Fall.

4. The city of Kingston has now ample grounds and every convenience and accommodation for a large Fair; and is, morever, situated close to a mineral region, from whence specimens of numerous valuable metals may conveniently be obtained. The Kingston city council, we are informed, have specially invited your Board to hold a Fair there in 1892; and we are advised that it is the desire of the people generally.

For which reasons we unite in the request that you will give the matter your serious consideration, and if at all consistent with the power and circumstances of the Board, that you will arrange to hold a Provincial Exhibition at Kingston some time in the Fall of 1892.

Mr. LEGGE introduced a deputation from Kingston consisting of Mayor Drennan, Alderman Hardy (representing the merchants of the city) and Mr. Robert Meek, Secretary of the Midland Central Fair Association. Being invited to state the case they had come to present, the members of the deputation addressed the Council.

Mayor DRENNAN said that if the Association intended to hold a Provincial Fair in 1892 he was present on behalf of the city of Kingston to urge that the Fair be held there. He stated briefly the advantages of Kingston, its central situation and the facilities for reaching it by rail or water. Kingston, he said would afford every accommodation. There were already fine grounds and buildings, and if the buildings were not large enough the city was ready to enlarge them so as to furnish the accommodation required.

Mr. MEEK said that so far as the Midland Central Fair Association was concerned the position was this—the Association was in a position to go on with a Fair next year whether the Provincial Fair was held in Kingston or not. If the Agriculture and Arts Association decided to hold a Fair, the Midland Central Association would furnish the grounds and would assist in the work in every way possible. The Association in Kingston had suspended its preparations, pending the decision as to holding a Provincial Fair. He recognised that the Agriculture and Arts Association in this matter was dependent to a great extent upon the Government making the necessary appropriation. All that was asked by the Association he represented was that the Council should pass a resolution declaring in favor of holding a Provincial Fair in Kingston in 1892, provided the customary grant was given. If such a resolution was passed the Kingston association would assist in persuading the Government to make the grant.

Alderman HARDY said that the merchants of Kingston were fully alive to the importance of the subject, and desired that if possible a Provincial Fair should be held in their city next year. Such a show would attract many Americans, as even their local show did when it was held. He referred to the assurance given by the city that all necessary accommodation would be provided, and expressed the hope that a resolution such as that mentioned by Mr. Meek would be carried at this meeting.

Mayor DRENNAN spoke of the advantage of holding a Provincial Fair in Kingston in 1892 as a means of facilitating the choice of stock to be sent to the World's Fair in the following year.

Mr. RAWLINGS said that this was the most generous offer that had ever been made — all accommodation provided, leaving the Association nothing to do but pay out the prizes.

Mr. LEGGE moved, seconded by Mr. Rawlings:

> That in view of the fact that no exhibition of such magnitude as the Provincial is now held east of Toronto, and as in the wording of one of the resolutions read at this meeting the whole eastern portion of the Province is left without an Exhibition that is general in its relations and advantages; and in view of the necessity for selection of stock and other products for the World's Fair to be held in 1893 at Chicago, this Board presses upon the Government the desirability of making a grant of $5000 to the Agriculture and Arts Association for the purpose of a Fair in 1892, and if the grant is made that the Fair be held in the city of Kingston.—*Carried.*

In presenting this resolution Mr. Legge said the petition signed by the reeves and deputy reeves represented 65,000 people, that from Kingston 20,000, and that from Frontenac 15,000, or 100,000 people in all, whose representatives had asked on their behalf that the fair be held in Kingston. He added that there were 600,000 people in the eastern counties of Ontario, the district to be benefited by holding this fair as desired. Many of these people would be unable to visit Chicago to see the cattle from Ontario there, and if the fair were held and the cattle were brought there for exhibition the people of the eastern district would have the advantage of seeing them before they went. As most of the cattle for exhibition at Chicago would come from western Ontario, the money granted for prizes would go to that district. He thought the people of the western section of the Province ought to be willing to have the cattle exhibited at Kingston for selection as proposed.

Mr. SISSONS said he could see that there might be some difficulty in those members who had within a few years consented to do away with the Provincial Exhibition supporting this resolution. For his own part he had always been opposed to doing away with the Provincial Fair. It was said that it did not pay, but experimental work such as they were carrying on was not supposed to pay. The Industrial at Toronto benefited the people of Toronto more than any others, and it was not altogether an agricultural show. The riding shows were being given up; they had had their day. He favored the resumption of the Provincial Fair, and was in sympathy with the request made by the deputation from Kingston.

Mr. MORGAN expressed pleasure at seeing the people of Kingston, through their representatives, make the request they had made accompanied by the assurance that all necessary accommodation for the Provincial Fair would be provided. The least the Association could do he thought was to apply for the grant, and if it were made to hold the fair. He expressed the hope that the Provincial Exhibition would be resumed and would be held in different parts of the Province, wherever its presence was likely to do the most good.

Mr. AWREY said that if the Provincial Exhibition were still in existence there was no place he would more cordially favor than Kingston. But behind the resolution of this Board on the subject was one behind which the board could not go—the resolution of the Legislative Assembly. That resolution declared the policy of the Legislature to be against the holding of Provincial Exhibitions. Again, they must remember that the Association was asking for very liberal grants in connection with the World's Fair besides the regular grant. If they did not want to imperil the success of Ontario exhibits in Chicago they should not ask the Legislature for too much money at one time. He felt confident that the grant would not be made, and believing as he did in dealing frankly with the people of Kingston, he opposed the resolution as one holding out hopes which could not be fulfilled.

Mr. RYKERT contended that the votes of the members of the Legislature on the question of suspending the Provincial Fair were intended to meet public opinion, and that since the question had been voted on, great changes had taken place in public opinion in favor of the Provincial Exhibition. In the debate on the subject it was stated that the people from the Eastern part of the Province were wholly opposed to the Exhibition. It was quite evident that there had been a complete change in that section. As to the grants asked for the Chicago World's Fair, he thought the Legislature would be generous enough to consider the two questions quite distinct. He favored the resolution proposed by Mr. Legge.

Mr AWREY said this sum must go into the estimates before it could be voted on in the Legislature. The estimates as proposed by each head of a Department were materially reduced by council. They should be careful therefore not to make unreasonable demands. The chief result of this resolution, if carried, would be to embarass Mr. Dryden. It was folly to hold out hopes which could not be realised.

Mr. ROWAND favored the plan of securing the grant before deciding where the fair should be held. He knew of no place he would prefer to Kingston. The Provincial Fair was abolished because the people had not sympathy with it, but he believed that as the local shows were dying out and the circumstances were changing, public opinion on the subject was changing also. The principal argument in favor of the grant would be that the Provincial Fair would furnish an opportunity for selecting cattle for the Chicago show, and the Minister would of course consider whether some cheaper plan could not be adopted. His sympathy was with Kingston or any other place that had pluck enough to try to get the show; at the same time he would not like to have the council ask and be refused.

Mr. **Sissons** expressed the opinion that there was no danger of the farmers getting too much out of any Government. The Association was not extravagant and ought to ask for whatever sums were fairly needed for its work. If they spoke emphatically he felt confident the Government would grant the money.

Mr. **Rykert**.—They will not unless we are unanimous.

Mr. **Awrey**.—I say frankly I will not vote for any such resolution as that.

Mr. **Haggerty** favored the resolution. The request was a reasonable one and he believed the Government would grant it. In the Belleville section they had always been of opinion that the Provincial Exhibition ought not to be abolished. As to the other sums asked for, it is not we who ask for it; the Government grants it for the purpose of making a good show at Chicago in 1893.

A vote was taken on the resolution submitted by Mr. Legge, which was carried. The yeas and nays being called for, they were recorded as follows:

Yeas: Messrs. Legge, Dawson, Rykert, Rawlings, Sisson, Morgan and Haggerty—7.

Nays: Messrs. Snell, Simmons, Awrey and Rowand—4.

Mayor **Drennan**, on behalf of the deputation, thanked the council for the kind reception extended to them, after which the deputation withdrew. The meeting then adjourned.

Guelph, December 10th, 1891.

All the members of the Council were present except Mr. Macpherson and Mr. Rykert.

Mr. **Awrey**, for the Finance Committee, presented the following report:

To the President and Directors of the Agriculture and Arts Association:

Gentlemen—Your Finance Committee after most careful consideration have decided to ask for the following appropriations. Your Committee have kept their estimate for the ordinary expenditure within the very narrowest possible limits, but realise that in view of the abnormal expenditures in the near future our wants will be largely augumented. You will notice than an appropriation *re* Chicago Columbian Exposition is being asked for, but at the same time you will bear in mind that the bulk of the amount will not be required until the year 1893. In order to insure confidence amongst breeders throughout the Province your Committee have deemed it advisable to ask the Legislature to make the appropriation for the incoming year as an inducement to exhibitors to prepare exhibits for the Columbian Exposition.

Spring and Fat Stock Shows	$1,500
Plowing matches	600
Expenses of Council	500
Printing	700
Salaries	700
Prize farms	500
	$4,500

Your Committee would also recommend that a sum not to exceed $1,000 be granted to the Dominion Short Horn Breeders' Association to complete the printing of old pedigrees. Your Committee would further recommend that the following sums be asked:

For expenses selecting stock, etc., for Columbian Exposition	$2,000
For prizes, to be given in Chicago or elsewhere for exhibits from Ontario, per Schedule proposed by World's Fair Committee	14,000

All of which is respectfully submitted.

(Signed) N. AWREY,
Chairman.

Mr. HAGGERTY moved, seconded by Mr. DAWSON, that the report be referred back to the Committee with instructions to amend it by including in the estimates a sum of $5,000 for a Provincial Fair at Kingston in 1892.

The motion was carried and the yeas and nays being called for they were recorded as follows :

Yeas—Messrs. Legge, Dawson, Rawlings, Sissons, Morgan and Haggerty—6.

Nays—Messrs. Snell, Simmons, Awrey and Rowand—4.

A deputation representing the South Wellington Plowing Match Association was then introduced, consisting of Messrs. Benjamin Tolton, President, Peter Mahon and C. Cameron, Directors, Charles Hobson, James Innes, M.P. and D. Guthrie, M.P.P.

Mr. HOBSON, on behalf of the deputation, said their request was that the Association should give a portion of the money appropriated for plowing matches, say $150, to continue the plowing match at this particular division, with the central point, say at the College. For twenty or thirty years past the people of the locality had held plowing matches annually, had spent their money liberally and had made their plowing matches very successful. Thus a strong interest in the matches had been maintained and the matches had done a great deal of good.

Mr. GUTHRIE said the request was put not upon local but upon Provincial grounds. There were young farmers at the College from all parts of Ontario, and all took a keen interest in these plowing matches and when they returned to their homes they told what they had seen and learned. Then this locality was the centre of education for this purpose, and a moderate grant toward this object might reasonably be given.

Mr. Mahon, Mr. Innes, M.P. and Mr. Tolton also advocated the proposal in brief speeches.

The President thanked the deputation for bringing the matter forward, and assured them that the Council would give it careful consideration.

Consideration of the report of the Finance Committee was then resumed, and after discussion of the various items the report was adopted.

The following letter was read :

OTTAWA, Ont., September 16th, 1891.

HENRY WADE, ESQ.,
Secretary Agriculture and Arts Association of Ontario.

Re O'BRIEN & MURPHY.

DEAR SIR,—Some time ago, you will remember, we entered into an arrangement by which the Association was to accept $300 in full settlement of claim against O'Brien & Murphy provided all costs of suit were paid by them. We now write to say that we have succeeded in collecting the above amount and taxed costs, and have taken the liberty of deducting $30 for costs not properly chargeable against the defendants, and beg to enclose herewith cheque for the balance. As we have had considerable trouble in collecting the claim in small payments we trust this will be satisfactory to you. Kindly acknowledge receipt and oblige,

Yours, etc.,

NELLIS & MONK

Moved by IRA MORGAN, seconded by A. RAWLINGS and resolved, that John I. Hobson, of Mosborough, be appointed Auditor for this Association.

Under the authority of the Statute, Joseph Bigelow, of Port Perry, was appointed Auditor by the Minister of Agriculture.

Mr. Sissons moved, that this Association hold a fat stock show next December, and that the sum of $1,000 be voted for the purpose. Mr. Haggerty seconded the motion.

Mr. Awrey suggested that action on this subject should be left for the incoming Board. It ought to be dealt with at the first meeting after the election.

Mr. Snell urged that the fact that the show was to be held ought to be thoroughly understood.

The President ruled the motion out of order, the subject being beyond the jurisdiction of the existing Board.

Mr. Sissons moved, that this Board suggest to its successors in office next year that the sum of $1,000 be devoted to holding a fat stock show, details to be settled not later than the annual meeting in March. Carried.

The Secretary read the report of the judges in the Prize Farm competition as follows:

REPORT OF THE JUDGES ON PRIZE FARMS, 1891.

To the Council of the Agriculture and Arts Association:

Gentlemen,—Having been appointed judges of Group No. 5, comprising the Counties of Addington, Frontenac, Hastings, Peterboro, Victoria, Northumberland, and Renfrew, we commenced our duties on the 29th June, just at that season when most farmers are preparing for hay-cutting, making it a question whether it might not (if this work is to be gone on with) in the future be an advantage to commence somewhat earlier.

It may not be generally known that the rules which were laid down for the guidance of the judges when this work of farm judging was first begun, and which continued in force up to last year, were then revised and slightly altered, and that this year we were working on the revised rules.

Such being the case, we have thought it well to preface the report with a publication of them. They read as follows:

In addition to any other points that may be thought desirable by the judges, the following shall be taken into consideration in estimating what is "the best managed farm":

1. The competing farm to be not less than one hundred acres, two-thirds of which must be under cultivation.

2. The attention paid to the preservation of timber and shelter by planting of trees.

3. The condition of any private roads.

4. The sufficiency and condition of fences suitable for the requirements of the farm.

5. Improvements by removal of obstacles to cultivation, including drainage.

6. The condition and suitability of implements and machinery.

7. State of the garden and orchard.

8. Management of farm-yard manure.

9. The manure and application to the cultivation of the soil for the growing crops, as well as methods adopted for increasing the quantity and quality.

10. In arriving at a decision the judges must consider as the essence of merit the relation of profits in proportion to cost of production with due regard to maintaining the fertility of the soil

The number of entries made this year was forty-nine, being largely in excess of any previous year. These are given below:

Name.	Post Office Address.	Electoral District.	Lot.	Con.	Township.
W. J. Dolmage	Newburgh	Addington	23	4th	Camden
J. B. Aylesworth	"	"	17	2d	"
Alf. Hunter	Harrowsmith	"	4	4th	Portland.
Romain Mosier	Wolfe Island	Frontenac	3	6th	Wolfe Island.
George Wills	"	"	2	9th	"
Richard Moor	"	"	7	6th	"
T. C. Stark	Gananoque	"	35	3d	Pittsburg.
G. N. Clare	Belleville	East Hastings	Part 6 & 7	7th	Hungerford.
H. J. Mouch	Tweed	"	6	9th	"
Wm. Elliott	Thomasburg	"	5	7th	"
Sidney Way	Chapman	"	8	6th	"
George Rutledge	Thomasburg	"	3	7th	"
W. A Martin	Belleville	"	S. ½ 27	5th	Thurlow.
J. O. Huffman	Blessington	"	29	5th	"
John Huffman	"	"	26	5th	"
Albert Jones	Corbyville	"	15	5th	"
J. V. Ketcheson	Philipston	"	14	8th	"
John Campbell	Havergal	North Hastings	26	9th	Mayo & Carlow.
John Mackey	Boulter	"	20	2d	"
W. C. Parkhurst	"	"		7th	"
Thomas Caskey	Madoc	"	1 & 2	7th	Madoc.
T. H. Tumilty	"	"	3 & 4	8th	"
G. H. Dunn & Son	"	"	2	7th	"
Joseph Dawson	Baillieboro	West Peterboro	W. ½ 7	2d	Monaghan South.
Nichol Dawson	"	"	N. ½ 3 & pt. 4	1st	"
John W. Lucas	"	"	1	A brkn frnt	"
J. Fred Davidson	Peterboro.	"	N. ½ 19	5th	Smith.
G. W. Mann	Bridgenorth	"	13 & 14	8th	"
James Davidson	Peterboro.	"	Part 20	5th	"
George English	Hastings	Peterboro			Asphodel.
Henry Humphries	Norwood	"			"
George Blanchard		North Victoria			Bexley.
Peter Cameron		"			"
Norman L. Campbell	Lorneville	"	S. ½ 6	1st	Eldon.
James S Jordan	Woodville	"	W. ½ 2	6th	"
McEachran Bros	Argyle	"	14	5th	"
Robert Oxby	Cambray	"	E. ½ 7	3d	Fenelon.
J. D. Naylor	Fenelon Falls	"	W. ½ 23	11th	"
John Willocks	"	"	W. ½ 16	7th	"
Wm. Westington & Son	Cobourg	Northumberland	23	8th	Hamilton.
James Russell		"	23	8th	"
A. M. Westington		"	23	2d	"
James Martin	Renfrew	South Renfrew	7	3d	Horton.
John Gibbons	"	"	10	3d	"
John Airth	"	"	9	3d	"
Donald Campbell	"	"	E. ½ 16	4th	Admaston.
Peter Campbell	"	"	W. ½ 16	4th	"
George Cardiff	"	"	13	3d	"
Andrew Young	Peterboro	Peterboro	E. ½ 3	12th	Monaghan North.

Your judges met at Toronto on the morning of the date named above, taking the afternoon train for Woodville. On the way we passed through those splendid farming townships to the north and east of Toronto. Perhaps there is no other part of Ontario that gives indication of more prosperous farmers than that passed through on the Midland road between the metropolitan city of the west and Markham station.

At Blackwater Junction our first troubles commenced. Waiting for the train to take us to Woodville we were told that the engine had broken down and another was coming from Lindsay to bring on the train. A two hours' wait, and a start was made for Woodville.

Next morning we took the road by the way of Lorneville for the farm of

NORMAN L. CAMPBELL, TOWNSHIP OF ELDON, NORTH VICTORIA.

This farm is situated 4½ miles north-west of Woodville. It comprises 103 acres, and may be termed a very good all-round farm. Soil, a clay loam. Some under draining has been done with stone. Buildings medium, included in the buildings is one situated on the private road towards the back part of the farm. This is large enough to admit of a team being driven in without taking them apart, and sufficient room besides to store away farm implements. This struck us as an excellent idea, being convenient when caught in a rain storm while working on that part of the farm and for putting under cover the implements when not in use, as well as reducing the risk of loss by fire when using it as an implement house in winter. The fences, like the buildings, might be classed as medium. The private road was well made and the field arrangement convenient. The crops, with the exception of the turnips, had been well put in and looked promising. The turnip field had been roughly handled, the coarse manure was seen lying all around on top of and amongst the drills. The whole farm is exceptionally free from thistles and weeds.

The water supply is from two wells and a cistern at the barn. About an acre on the west side of the farm had been planted with young trees, and in a few years will make a nice grove. Planting has also been done along the side of the public road, and a few handsome trees are to be seen around the enclosures adjacent to the buildings.

MCEACHRAN BROS., TOWNSHIP OF ELDON, NORTH VICTORIA.

Our next stopping place was at McEachran Bros. These gentlemen occupy altogether about 700 acres—200 of this was entered for competition. The crops included 30 acres of wheat, 12 acres of barley, 34 oats and 4 acres of peas, 27 acres for hay, red clover for seed 27, alsike for seed 18, pasture 24 acres, the balance of the farm being bush.

The crops on this farm we found had suffered very much from the prolonged drouth. So parched was the grass that it crackled beneath the foot. Much of the land being sharp and porous, was of a nature requiring more rain to produce goods crops than the heavier loams which prevail in other parts of the same township. The fields were clean and free from weeds and gave evidence of good cultivation. The meagreness of the crops we have no doubt whatever was caused, as already said, by the soil of this farm being less fitted to withstand the extreme drouth than the heavier ones. The general arrangement of the fields was pretty fair. A well made private road runs from the front to the last range of fields at the back, dividing the farm evenly in the centre. In the central portion of the farm it is only fenced on one side, being open to the bush lot which is not, as is often the case, at the rear of the farm, but which in this case has been left about the centre. The timber on this wood lot consists of maple, beech, elm, basswood and hemlock. On the fenced side of the private road is a fine lot of second growth timber, mainly elm. The orchard and garden were fairly good. Included in the orchard is one of two years' growth ; this has been well attended to and looked healthy and vigorous.

The barn buildings are up to the average ; the dwelling house a new storey-and-a-half brick, well adapted for a farm house. The stock includes a lot of strong grade Clyde horses, with a few registered ones. Considerable attention has been paid to the improvement of the cattle kept on the farm, an imported Durham bull and some registered females having been bought at different times from well known breeders. A flock of fifty sheep is kept. An effort is also being made here to breed up to higher lines, preferring Shropshires. They had at the time we were there eleven pure-breds raised from stock purchased from the Hon. John Dryden. These young men possess the knowledge, as well as the means and the ambition, which will be likely to be brought into full play in the direction of making their mark as successful breeders of high-class stock.

Quite a number of pigs are raised and fattened, sixty-six being in the pens at the time of our visit. These pigs were being fed on chopped grain. This feeding they intended shortly to supplement by allowing them to have the run of a clover field ; afterwards they would be turned on to the stubbles and have as well a field of peas ; when these would be cleaned off they would be finished off in the pens and sold in October, the principal part of the feeding being wisely done in summer and made ready for market at a time when good prices are generally realised. On this farm the raising and feeding of hogs has been carried on systematically and extensively and has been found to give good results. The fences of straight cedar log and partly of rail have been substantially built. Some underdrains have been put in where required. When dealing with the crops we might have added that fifty or sixty acres of clover seed is grown annully and has been found to give good returns.

Nothing special need be said about the management of the manure further than it appeared to be pretty well protected from waste, and their system of applying it to the land is to draw it out in September, often putting on the fields that have been already plowed and then covered in with another furrow. McEachran Bros. are fine specimens of the intellectual, energetic young Canadian farmers. They are even in these hard times making money at farming; they belong to that class of men who would be certain to succeed in any country, relying as they do largely upon individual effort.

PETER CAMERON'S FARM, TOWNSHIPS OF BEXLEY AND CARDEN, NORTH VICTORIA.

Bronze Medal.

A long drive had to be taken before we reached the above named farm. Starting in a north-easterly direction we took the road by Kirkfield, driving nearly the whole distance through poor, thin land, not passing a first-class farm the whole way, the land for the most part being rugged and broken, with the rock coming out to the surface, and with the soil generally speaking light and sandy.

On our way we passed the farm of the late George Laidlaw. This estate comprises somewhere about 4,000 acres; it is a very fine property beautifully situated on the western shore of Balsam Lake. It struck us as we drove slowly through this fine estate with its long stretches of exceptionally well built stone dykes on either side, with its large and commodious stock barns, its splendid water supply, and its great fields of fairly good grass, that Mr. Laidlaw when he went into farming on this land fully realised that the best use it could be put to would be stock farming; in this he acted wisely. There can be no doubt whatever that the farmers in this rugged section of the country are heavily handicapped as grain-growers when compared with those occupying the cheap and fertile lands of our great North-west. Unquestionably one of the many difficult problems to work out in connection with the agriculture of this country is, what is to be done with the poorer lands, for it is a weary life to spend year after year amongst the rocks and stones and barren lands making but the barest pittance and too often in the end being beaten in the struggle. The possibilities of these rougher sections of Ontario assuredly are in the direction of stock-farming in some form; then if that be admitted it would appear to be necessary, to insure a full measure of success, that the individual proprietorship should cover a larger acreage than is occupied within the bounds of the average sized farm.

Going back to our work of farm judging we found Mr. Cameron at home busy in his potato field, and his two strong healthy looking sons hard at work on the other side of the farm, bringing under cultivation a wide stretch of meadow land which, until recently, had always borne heavy crops of natural grass. A year or two ago a deep Government drain had been put through, and now this rich porous soil has been rendered too dry to produce any longer a heavy cutting. Mr. Cameron we found to be a fine type of the shrewd, industrious and persevering Scotchman; a man who had overcome great difficulties, and has, no doubt, endured much hardship before he has come to occupy the position which he does to-day, that of a successful farmer on a farm where great obstacles had to be encountered. On this farm there is great diversity of soil; that under cultivation being clay loam, this lying mainly near the front. In the central part is a large beaver meadow, with a deep covering of black loam underlaid with marl. Beyond this beaver meadow and farther from the buildings are a good many acres of poor stony land of no use for any other purpose than pasture, and at the extreme rear of the farm are about thirty acres of fairly good land newly cleared which has been seeded down to grass.

With the exception of a field of fall wheat which had been badly winter-killed the crops were good and the fields clean. The system of cropping, as far as we could judge, appeared to be well suited to the nature of the soil and local conditions.

The cattle we found to be fairly good grades. In the stock line Mr. Cameron stands out prominently as a breeder of first-class sheep, having for over twenty years been the most successful prize taker for Leicesters at the local shows. It might be here added, when speaking of exhibiting, that some years ago when a prize of $50 was given to the grower of the best three acres of turnips that Mr. Cameron was successful in winning that prize. The buildings are not by any means equal to those which are so commonly to be seen in the more favoured districts of Ontario, but yet they are in no way to be found fault with when the difficulties are considered. A very noticeable and pleasing feature in the home life on this farm was the marked social conditions, for although the dwelling house was plain and unpretentious, yet order and neatness were observable on every hand, and that air of comfort so readily felt pervaded that pleasant farm home.

Mr. Blanchard's Farm, Townships of Bexley and Carden, North Victoria.

Thinking that, where men were well provided for, horses would not be neglected, we left our poor, tired horse to rest and feed while we walked half a mile to see the above-named farm. This, like the last one, is bounded on its west side by Balsam Lake. It was a mistake on the part of some one that this farm had been entered, for it was in no sense a show farm. We spent but little time in examining, and were soon on the road again. An eighteen mile drive was before us ere we could put up for the night at Fenelon Falls.

For about three miles we retraced the road we had come, and very enjoyable it was in the cool of the evening to drive along the shores of that beautiful lake, with its waters shimmering in the setting sun. Reaching Fenelon Falls late at night, tired, but having the satisfaction of knowing that we had put in a solid day's work, having inspected four farms and driven more than fifty miles, a large part of the way over heavy and bad roads, including a few miles of corduroy, arrangements were made that night for an early start next morning, but instead of the early start we had to keep indoors, listening to a steady downpour of rain, welcome even to your farm judges after the long-continued drouth. As the forenoon wore on, and we got through writing up notes of the previous day's work, we began to be anxious to get out again. So, after carefully considering the chances of its clearing up, we had our horse brought out, and through a steady rain drove to the farm of Mr. J. D. Naylor.

Mr. J. D. Naylor's Farm, Township of Fenelon, North Victoria.

This farm is situated on the Bobcageon Road, a short way from the village. It comprises 100 acres, the soil being of a very mixed character, consisting of sand, light sandy loam and gravel, with a great deal of small limestone over the whole surface. The field arrangement is not very convenient in the matter of being reached by private roads, and the fences might be a little better and yet not be termed first-class. The various barn and other out-buildings are roomy enough for the requirements of the farm, but are not very well fixed up, and are somewhat straggling; but when this little fault-finding has been done we would yet say that Mr. Naylor must manage his farm intelligently to have succeeded as he has done, and that in many respects he is away ahead of many of the competing farmers. Considering the nature of the soil, it must be a most difficult farm to manage. In the first place, it is naturally a poor soil that requires a good deal of nursing before paying crops can be grown; and, secondly, a large part of it is so full of stone that no amount of gathering will ever make it an easy farm to operate machinery on, for every time it is plowed they come up as thickly as ever.

The acreage of the different crops were as follows: 12 acres of wheat, 13 of oats, 4 acres of rye, pasture 20, meadow 23, the balance roots, orchard, yards and rough pasture land. Mr. Naylor's practice with the grass land is to mow one year and pasture two. A land to be prepared for next year's crop is plowed twice in the fall, first, thinly after harvest, and then deeply later in the season.

Six cows are kept, the milk being sent to the cheese factory, and six cattle are fattened annually. An average of 35 well-bred Southdown sheep, including lambs, are summered, and usually [illegible] ewes wintered. This flock is pure and well-bred, the ram now in use being a prize winner at the Toronto Industrial in 1890. Mr. Naylor is, very wisely, a strong advocate of using nothing but pure and well bred sires in every class of stock. Another strong point in the stock management of this farm is that from the time of birth the young animals are fully and liberally fed, the idea carried out being to keep them constantly and rapidly growing.

MR. JOHN WILLOCKS' FARM, TOWNSHIP OF FENELON, NORTH VICTORIA.

Bronze Medal.

Driving back to the village through wet and sloppy roads, we reached there at noon. In the afternoon we took the opposite direction from that taken in the morning, this time driving south westerly for five miles. The soil on this farm varies from sandy to clay loam, with [illegible] subsoil. A great deal of draining has been done, at first with wood and stone, but of late years tile has been used altogether. The fields give evidence of pretty thorough cultivation, not only in the matter of freeness from weeds, but also from the bulky and even crops.

The fences are strong and substantially built of cedar rail, with upright stakes firmly set in the ground and fastened with wire at the top.

The farm buildings are a large, useful lot, with many little conveniences, including a number of box stalls so arranged as to be very convenient when required to be used for either horses or cattle.

The dwelling house, built of brick, a story and a half, is in every respect a good farm house. [illegible] must not be omitted, when speaking of the buildings, a mention of one much used by Mr. Willocks. This building is in two divisions, one part being used as a carpenter's shop and the other as a blacksmith shop. These shops have a full supply of all necessary tools and machines, including drills, turning lathes, jig saw and almost everything required in an ordinary carpenter and blacksmith shop.

Mr. Willocks, having a taste in that way, and having had long practice, is quite equal to the average country mechanic in making or repairing anything in their line required on the farm. Now, we do not wish it to be understood that we think it advisable that a farmer should do his own carpenter or blacksmith work, however handy he may be. In fact we think, generally speaking, that it is a mistake, in all places within easy reach of mechanics, for a farmer to do this sort of work, believing that his time will be much more profitably employed in attending to the necessary work of the farm.

A herd of from 30 to 40 cattle is kept, the cows being an exceptionally fine lot. In the [illegible] we [illegible] to see a number of good colts of different ages.

Mr. Willocks we would set down as an energetic, pushing and money making man, lacking somewhat in the matter of keeping things around him in order. This was particularly noticeable in the yards and around the buildings, piles of old timber and half rotten logs being scattered around, which were of no value excepting for firewood. And if these and [illegible] up implements were disposed of in some way, so as to take them out of sight, the general appearance of the surroundings would be much improved. While speaking of [illegible] implements it is only fair to mention that those in use were well cared for and comprised everything required for carrying on the summer and winter work of the farm, Mr. Willocks preferring to do as little hiring of machinery as possible. So here we find drag and circular saws, a straw cutter with elevator attachment, and a set of burr stones for doing his own grinding.

We had an opportunity of seeing on this farm the difference in the results brought about by managing an orchard in different ways. One part of it had been well cultivated and kept free from grass, the other portion was in sod. The difference in favor of the cultivated part was very marked. This was only another instance of what we have often observed before. Bidding good bye to Mr. Willocks, we hurried on our way to the farm of

MR. ROBERT OXBY, TOWNSHIP OF FENELON, NORTH VICTORIA.

This gentleman farms 500 acres, of which 102 was entered for competition. The soil is good clay loam, with the rock in many parts of the farm coming near the surface. This has prevented Mr Oxby from carrying out the much-needed work of underdraining, which, if it could have been done, would have greatly benefited this land. As it is, the water is carried off in open ditches.

The buildings comprise what had been the original homestead and a new bank-barn at another part of the farm. The lack of tidiness detracted somewhat from the appearance of this property. The cattle are ordinary Durham grades. Eight cows are milked, the milk being made into butter and sold for the standing price during the summer of 18 cents per pound. For eight years in succession Mr. Oxby's daughter has taken the first prize for butter at the Lindsay Central Exhibition.

The strong point on this farm is the breeding of horses. Two stallions are kept, one a Canadian Clyde, the other a fine, showy looking bloodhorse, got by the noted stallion Warmanby, winner of the gold medal in his class at the Centennial. A business is made of getting up matched teams, having them thoroughly broken, and for these full figures are generally realized. Mr. Oxby is strong along some lines, and is a fairly good farmer, but yet a great deal of work requires to be done on this farm before he can compete successfully with many of those entered for this year's prizes. By the time we got through with the inspection of this farm the sun was sinking low in the west, and it seemed very doubtful if we were going to have time to finish up our work in the county of Victoria without losing another day. By the time we reached the last farm the sun had set, and the night was fast closing in.

MR. JAMES S. JORDAN'S FARM, TOWNSHIP OF ELDON, NORTH VICTORIA.

Silver Medal.

We had, by the time we reached this place, made up our minds that unless it was quite evident that it was out of the race, it would be necessary for us to make some arrangement to see it again, as it was getting altogether too late to do the work properly. To make matters worse, there was no one at home. As we found out afterwards, they had all gone to Woodville to see the fireworks, it being the 1st of July. All we could do was to take a general look over the farm, and we soon came to the conclusion that it was going to mark well up and must be seen again, and, if nothing better could be done, one of us would have to make a special visit to see it, for going out next morning was out of the question—it meant missing the morning train, losing a whole day and upsetting all our arrangements. As the last rockets were being sent off we drove into Woodville. The following morning we took the first train for Peterborough, reaching there about noon, and were soon afterwards on the road to Mr. James Davidson's.

MR. JAMES DAVIDSON'S FARM, TOWNSHIP OF SMITH, WEST PETERBOROUGH.

It is five miles north of Peterborough, very pleasantly situated, with a southern aspect. There are 200 acres in all, of which 100 were entered. The soil is a strong clay loam, much improved by underdraining. The crops give ample evidence of first-rate cultivation. Spring wheat, of which 40 acres are grown, looked especially well. The other crops consisted of oats, peas, barley and roots, the latter of which only a small acreage is grown. The fences medium, partly only cedar rail, balance mainly straight and laid on a foundation of 18 inches of stone. The private road in fairly good shape. Field arrangement good. A number of beautiful elms scattered over the farm add very much to the landscape view, and serves a useful purpose in the pasture fields. The buildings form three sides of a square. They include the main barn, about 130 feet long, with stone basement, a large part of which is used as an open shed. A building about 70 feet long, on the south side, is used for a horse and cattle stable, and another building 50 feet long is situated on the north side of the yard. Besides these are a number of smaller buildings used for various purposes. The residence is large and pleasantly situated. The cattle are strong Durham grades, and were in fine condition. The sheep were above the average,—a fine even flock that had been well attended to.

While examining the growing crops we noticed a marked difference in one of the fields of wheat. On inquiry as to the cause of one part of the field being so much in advance of the other, we were told that it was brought about by the difference of the manure used, in every other respect the whole field had been treated alike. The part which showed best (20 per cent. ahead we thought) had been manured with that kept under the sheds, and the remainder with that made in the open yards. It must not, however, be taken for granted that this can be relied upon as a fair and satisfactory test, for the barn and buildings on the north side have no eave troughs, and not only is the yard, which is a large one, exposed to the leakage from all the rain that falls, but also from all the water that pours off the roofs of these buildings. It may also be remarked that the yard has sufficient slope to allow the water to run readily off after it has leached well through and taken with it much of the valuable elements of plant food.

We have again to repeat that, from our own observation, we feel sure that one of the weakest points of Canadian farming is the wretchedly bad management of farm-yard manure. It is the rare exception to find it properly attended to, and why it is that many otherwise good farmers should so neglect it passes our understanding. It certainly does not require costly manure sheds, or very much outlay in any way. In fact, it is an open question whether it is advisable to go to the cost of building manure sheds at all; but there can be no question that it is sound practice for the farmer to have the manure heap in that shape at all seasons of the year that will reduce to a minimum the loss by leakage. In most of the barn-yards of the farms we have inspected this year, a few days work would have made all the difference of having it in right shape, or lying, as was too often the case, scattered around.

On this farm, like many of those inspected this year, a great deal of work has been performed in clearing the land of stone. Besides having done much in this way, Mr Davidson has performed a great deal of labor judiciously in putting in fine shape parts of his farm which were comparatively worthless until these improvements were carried out; especially was this noticeable on a large stretch of flat land situated between the buildings and the public road.

MR. J. F. DAVIDSON'S FARM, TOWNSHIP OF SMITH, WEST PETERBOROUGH.

Bronze Medal.

Having got our notes of the last mentioned farm written out, we hurried on, for we had this farm to see and many miles to drive before our day's work was done. This farm comprises 100 acres, the soil being a sandy loam. With the exception of a few places on the farm which have been underdrained, the natural drainage appears to be about all that is required. The acreage of the different crops this year is: Wheat 18 acres, oats 10, peas 9, barley 4, in pasture and meadow. The rotation of crops pursued by Mr. Davidson is usually to cut two crops of hay, plow up and sow peas or oats, when it is dry and early land he prefers spring plowing for peas. If peas have been the crop, it is generally followed with fall wheat, but if oats, the succeeding crops will be roots and barley. The root and barley crop will be followed by spring wheat and seeded with timothy and clover. The fall wheat is followed by roots and barley, and then wheat. A small quantity of corn is usually grown. The cultivation of the land is very thorough. In preparing for peas the spring tooth cultivator is found to answer a good purpose, the object aimed at being to secure an even depth of cultivation. After sowing, the field is harrowed once and then rolled. In preparing the land for roots it is deeply plowed in the fall, and after seeding it is plowed with a light furrow, and the manure is applied. This is covered with a shallow furrow. The after-working for the root crop is very complete, and as soon as the turnip plant is large enough the horse hoe is freely used until the crop becomes too far advanced for it to be used with any advantage. Corn is generally grown in the same field with roots. It s sown in drills three feet apart, with half a bushel of seed to the acre. The cultiva tion is similar to that for roots. The fall management of the land is to manure the barley, stubble, plow and sow rape. This is used for late fall feed, and sometimes it is plowed under. The system of managing the manure is to draw all that is made in the winter to the fields where it is going to be used the following season, attention being paid to the mixing of the different sorts of manure. What is not required for the root crop is left until after harvest and, as already said, used on the barley ground. Earth, cut straw and gypsum are used freely in the stables in the winter. Occasionally green crops are plowed under as a preparation for fall wheat, clover being the principal crop used in this way. About 150 rods of draining has been done in the low places to bring about uniformity of conditions.

In cattle, the average number will be thirty head. Eight milch cows are kept and their calves raised. This herd is much above the average for this part of the country. A registered Durham bull is usually kept, but this year one owned on the adjoining farm is being used.

There are eight horses, including two brood mares, and a pair of light horses for driving and for doing the lighter work of the farm. The flock of sheep comprises fifteen pretty fair Leicester ewes and their lambs. A few pigs are raised and fed for home use, and generally six fattened and sold during the summer, Berkshires being the favorites.

The system of feeding on this farm is much in advance of that on many of the others in this year's competition. The young cattle are all comfortably housed in the winter, The milking cows are pastured and fed liberally with soiling crops whenever the grass becomes at all scarce, the supplementary feed being oats and peas, or oats and vetches, followed by fodder corn and later with turnips. In the winter the cows are fed with cut corn and straw or cut hay and straw, with pulped roots, bran and crushed grain. The feeding of the young stock is similar, only varying the quantity of grain and roots. Nearly all the fodder is passed through the chaff cutter.

The points which Mr. Davidson aims at in his stock management, are to make his farm carry as much stock as can be done profitably. Keep the young stock of all sorts in good condition so as to produce rapid growth and early maturity, and then sell as soon as they reach the stage when rapid progress becomes slackened. The milk is sent to the factory after the calves are reared.

Allowing twelve dollars to a cow for feeding two calves for two and a half or three months, the average for the six months is about $30, and to this is to be added what is realised for butter made in the winter.

The out-buildings are not much to be found fault with, yet it is safe to say that a little remodeling in the right direction would make them much more suitable for the purpose of handling stock.

A wind-mill pumps the water from a sixty-foot drilled well into a tank capable of holding thirty barrels. From the tank, water is taken underground to the cow stables, as well as a constant supply being kept in the yard at all times.

The driving shed and tool house is on the opposite side of the yard from the barn, and is 40 by 20 ft. The sheep house joins the straw barn and is 80 by 18. The pig house is situated at the end of the main barn and is 30 by 18.

The dwelling house is a pretty and well-constructed farm house with a cellar under the whole building, is heated with hot air and has both hard and soft water brought into the kitchen. The surrounding are trim and good taste has been displayed in laying out and keeping of grounds, orchard and garden.

Very little can be found fault with in the management of this farm. Nearly everything about it from the front to the rear fence of the wood lot, gave clear indication that Mr. Davidson was well up in his business and that he gave close attention to it. The fences of various sorts, post and board, wire and common rail were in pretty fair shape. Private road nicely made and well kept The wood lot of 20 acres at the back part of the farm was a model as regards management—this all the more noticeable because it is just what by most farmers is too often neglected—the common practice being to allow the cattle to roam through it eating every growing leaf within reach and doing much harm to the young timber by tramping and destroying the roots. In this bush lot of Mr. Davidson's, not only is there a very vigorous growth of young timber, but all blown down and dead trees are used for firewood. A row of healthy looking maples line the public roads which form two of the boundaries of this property ; trees have also been planted on each side of the private road running from the highway to the buildings, and on the N W. corner of the farm, in an outlying spot, there is what will be, after a few years' growth, a very pretty little plantation.

Mr. Davidson shows unmistakably that, as well as being a successful farmer, he fully realises the fact that it is not enough to merely own a home, but that something should be done to make that home pleasing and attractive—a nucleus around which would centre the sympathies and affections of the entire family. In this connection we would like here to say, that we do not wish it to be understood by the readers of this report, that we award the prizes for the best managed farm, to the owners of fine houses and beautiful grounds, or that we in any way consider that the strong point in the contest. On the contrary, we fully realise that the prizes should go to the man who can show first-class farming in the ordinary sense of the term, which means, well cultivated, land free from weeds, useful farm buildings, good stock management, and that careful attention to every matter of detail which brings to the farmer the best return for the capital and labour expended. But this we wish strongly to emphasise : That the man, who, as well as being a successful money-maker, considers that the social conditions are not to be ignored and who is desirous of making life pleasing and enjoyable to all around him, is better worthy of a prize, other things being equal than the man who has devoted all his energies to making money and has neglected the educational and social conditions of his family.

MR. G. W. MANN'S FARM, TOWNSHIP OF SMITH, WEST PETERBOROUGH.

An hour before sunset found us scanning not only the farm of Mr. Mann, but the beautiful scenery around. This is one of the most beautifully situated farms in Ontario. The view is magnificent as seen from any point, and especially from the fine grounds in front of the dwelling house as we saw it that fine July evening. The northern side of this property is bounded by Chemong Lake, the ground gradually sloping upwards to the highway which forms the southern limit of the farm ; from this point could be seen to the front and the westward, the lake with its tree-clad islands, the little steamer rapidly skimming over its smooth waters, the sun setting in the west with its last rays shimmering on its surface. Turning to the east and looking down the lake, was to be seen the little hamlet of Bridgenorth, and away beyond as far as the eye could carry, were to be seen the distant trees which line its shore.

However, the setting sun warned us that if we had work to do, it was time to do it, and as we had come here to look over the farm, and not for the purpose of solely enjoying beautiful scenery, we at once began on the more prosaic work of examining fields, inspecting stock, and taking notes generally.

The farm comprises 200 acres which is in the form of a triangle, the north side being bounded by the lake and the south by the highway. Running nearly parallel with the lake front, is a forced road dividing the property so as to leave about an even quantity of land on each side of the road, and owing to the shape of the farm and this last named road angling across it, many of the fields are of an inconvenient shape for working.

For about a third of the distance on the lake front, is a narrow strip of 16 acres of well kept woodland, with a living spring on the higher part of it. The principal crops grown are wheat, barley and oats. This year there were six acres of fall and forty acres of spring wheat. Between fifty and sixty acres are in grass, and besides this, Mr. Mann has fifty acres of grass land at some distance from the main farm where his young cattle are pastured.

The field management is much ahead of that on the average of the farms inspected in this year's group. The land is clean and the crops good. This property was bought and cleared seventy years ago by the grandfather of the present proprietor, and the fact of the land being comparatively clean and the fields bearing full crops, was to our minds, strong evidence that the system and the management were well suited to the nature of the soil. The plan followed in fall working is to plow a large part of the stubble land as early as possible after harvest, and then again later in the season. It has been very noticeable, not only on the farms entered this year but in former years also, that almost invariably the cleanest farms were those on which a great deal of work was done in the fall. As well as by good cultivation, the producing power of the farm has been much increased by underdraining all the wet portions, not less than a thousand rods of tile and stone drains having been laid.

Like much of the land in this part of the country, this farm at one time had on it a great deal of heavy stone; this has all been removed and it must have been at great cost of labor. It is very noticeable that different sections have their own peculiar physical conditions, and one of the peculiarities of this part of Ontario, is that the ordinary boulders are of immense size. The stock comprises a dozen horses, young and old, 26 cows, 19 head of young cattle, 21 sheep and lambs and 32 pigs. The milk is sent to a cheese factory, realising $26 per cow, besides keeping two houses in milk and butter during the factory season. After the factory closes butter is made for winter use, and about $3 per cow is obtained for what is sold. Mr. Mann informed us that his cows had given the largest quantity of milk of any of those owned by the patrons sending to the same factory. Now, while this no doubt is the case, we think it must be largely owing to good feeding, for they certainly were not by any means as fine a lot as some of the herds seen on other farms where the receipts were no higher. In fact in the stock line we considered Mr. Mann to be weak, and especially so in having at the head of his herd a bull of such a character that the sooner he is disposed of for a first-class animal, the better it will be for Mr. Mann's herd. We would have expected on this well worked farm that a little more attention would have been paid to the matter of having good fences. The striking feature in the buildings was a very fine residence, the grounds around are rendered attractive by some fine groves of pine. A splendid belt of cedar protects the orchard on two sides. Convenient to the homestead is a neat little brick house occupied by one of the hired men, and at another part of the farm is one used for a similar purpose. We think that in this matter of employing married men and providing comfortable houses for them, Mr. Mann is acting wisely. We believe that if this was more generally done and the system of farming so arranged, that profitable labor could be found during the whole year, that a great deal would be done towards overcoming what is one of the greatest difficulties in the way of Canadian farming. The barn buildings, while roomy enough and comprising some suitable for the purpose for which they are required, were in may respects very faulty, especially in regard to the stables being low and inconvenient. Although Mr. Mann's management is weak in some respects, he is yet so strong on other lines that he may well be classed as one of the good farmers of the country.

As night was closing in we started on our drive back to Peterboro', passing Bridgenorth on our way. This little place takes its name from a floating bridge a mile and an eighth long which crosses the lake at this point. One of your judges crossed the bridge two years before on a cold stormy morning, and he has had a great dislike to floating bridges ever since. On the following morning at the time we should have started it was raining heavily. This was all the more disappointing, as we had laid out as part of our plans to get through with a big day's work. Being anxious to get on, so soon as the weather showed signs of clearing, as we thought, we had our rig out with a fine team and a driver who was supposed to know the road. At the end of a couple of miles we turned and came back to Peterborough in a pouring rain. Sharp at 1 p.m. we again took the road bound to go through if the weather was at all passable. An hour's drive brought us to the farm of

MR. ANDREW YOUNG, TOWNSHIP OF NORTH MONAGHAN, PETERBOROUGH.

We found this a fairly well managed farm. The proprietor not being at home, we could not get much information. There was nothing about it, however, calling for special mention.

MR. NICHOLAS DAWSON'S FARM, TOWNSHIP OF NORTH MONAGHAN, W. PETERBOROUGH.

Silver Medal.

Our driver, who was supposed to know all about the roads leading to the farms we had gone out to inspect, as it turned out did not know any more about them than he would have done if he had just landed the day before from the old country. So after much enquiry, we found that we had to go by the way of Fraserville and Centreville and that we were 12 miles from Mr. Dawson's. Making the best time we could along the sloppy roads, we in due course reached the farm we had gone to see, and a very good one indeed it turned out to be. The original farm was 100 acres, but a later purchase of 65 acres has been added to it, now making a total of one hundred and sixty-five acres. The nature of the soil varies somewhat on the different parts of the farm, being clay, black loam and clay loam, principally the latter. No underdraining has been done, but about 500 rods of open ditches have been made to carry off surface water which comes on to this farm mostly from the adjoining land. This is an exceedingly well fenced farm, the front is post and board, strong and neatly built, and the interior ones equally good of their kind, being well built rail with upright stakes. Twenty acres are in bush, 15 acres on the front 100, and 5 acres at the rear of the back lot. This smaller part of the woodland adjoins a 20 acre of fine permanent pasture and the cattle are allowed to roam in it. The crops grown this year are wheat 27 acres, barley 5 (usually ten are grown), 16 acres of peas, 15 oats, clover and timothy, 28 acres.

Mr. Dawson, like many farmers, finds it very difficult to follow out any regular rotation, owing to the difference of soil and in the occasional failure in securing a good catch of grass. The usual course, however, is to seed to grass with wheat or barley, keep in grass two or three years, plow up for peas, followed by either fall or spring wheat, then barley seeded down. When the catch of grass fails, the land is sown with oats and afterwards summer fallowed for oats. The growing crops looked strong and luxuriant. A field of roots had been well put in and well attended to.

The stock included 10 horses; this is a larger number than the average of other years 13 cattle, this being much below the number usually kept; 50 sheep and lambs besides 17 lambs sold early in the season, and 14 pigs. The sheep are a very fine lot of well bred Shropshire. This flock was originally started from sheep bought from Grant & Campbell. The ram now in use was purchased from John Millar; the one previously used having come from the flock of Mr. Calicott.

The milk from a small number of cows is made into butter at home. From experience and careful testing of results, Mr. Dawson finds that cows coming in in the early part of the winter give larger profits than those calving in the spring. This is quite in accordance with the opinion of many of the best dairymen in the country. The calves are all raised and kept until two years old and then fattened.

The homestead was in every way the best we had seen up to this time. The water supply is from wells and soft water tank, all the buildings being supplied with eave troughs running into this tank. The dwelling house small but snug and in good shape, with well kept and pretty surroundings.

Mr. Dawson has been on this farm 18 years, and has done a large share of the work required to put it in its present shape, including the erection of the dwelling house and some of the other buildings, as well as purchasing an additional sixty acres. We consider that he has been a most successful farmer, and we may safely assume that he has worked his farm profitably and well. We have therefore recommended that the silver medal be warded to him.

A short drive took us to the next farm that owned by

Mr. Joseph Dawson, Township of Monaghan South, West Peterborough.

This is a first-class farm, bearing at the time we were there heavy crops—the fall wheat, of which a large area is grown, looking exceptionally fine, and the pasture land covered with a thick rich coating of natural grass. On these rich grasses were to be seen feeding a passably fair herd of grades, and in the stable was a Bates bull of a somewhat good stamp. The pig pens had in them a number of well-bred Berkshires of fine quality.

The field arrangement might be much improved upon with a very decided advantage to the owner. This may be put down as a productive farm with a strong rich soil, but there is nothing about its management that would take it out of the catagory of other fairly well worked farms.

Mr. John Lucas' Farm, Township of Monaghan South, West Peterborough.

The day was getting well advanced when we left the last mentioned farm, and, as it meant the loss of the greater part of another day, unless we connected with the train for Cobourg, due at Fraserville at 9.10 p.m., it was necessary to put on a spurt, so after a fast drive and going through the village of Baillieboro (on the outskirts of which is situated the farm we had gone to see) at a rate which made the villagers stare, we pulled up and at once went to work.

The buildings we need not describe further than to say that there is a finely constructed and showy dwelling house, and that the barns and other buildings comprising the homestead are being remodelled and enlarged, the material at the time we were there being on hand, and the workmen were going to begin the following Monday.

The system of farming appeared to be well suited to the nature of the soil and local conditions. Considering that Mr. Lucas up to two years ago had been engaged in the waggon and carriage making business, and consequently, his efforts having been concentrated for so short a time on farming, we think that what he has done stamps him unmistakably as a man of sound judgement and a good farmer, and further, that while not a prize taker this time, we saw sufficient evidence to warrant us in saying, that when a competition again takes place in this division he will be a very hard man to beat.

Saturday, July 4th, another wet morning. Your judges were beginning to feel that, although there had not been too much rain for the farms in this part of Ontario, yet it was becoming somewhat monotonous, and decidedly unpleasant for the men who were judging these same farms. About 10 a.m., thinking that a slight break in the clouds indicated clearing weather we plucked up courage, buttoned up our water-proofs and started off. One of your judges, who is somewhat of a horseman, and as well as handling the reins, had taken upon himself the task of piloting the way to the different farms, began almost as soon as we had left the hotel, to enquire of those we met, the way to the jail, leading his associate to think that he was going to try and secure free quarters until the weather cleared up; however, upon asking him if that was his intention, it was some relief to be told that, the institution we were in search of was built on the corner of the farm we were going to see.

Mr James Russell's Farm, Township of Hamilton, West Northumberland.

This farm lies on the outskirts of the town of Cobourg, on what is known as the Burnham road. That part entered comprises 300 acres, upon which is built two complete sets of farm buildings. This farm or farms is only a portion of 700 acres owned by Mr. Russell. This gentleman is one of those successful farmers who are found scattered all over Canada, and who bring to bear on the operations of the farm, those industrious habits, combined with that sound judgment and intelligence which forces them to the front, and enables them not only to hold their own but to make money in spite of hostile tariffs, the world's competition, and all those other ills which we farmers of late years are wont to complain of. Mr. Russell long ago found out that on the farm as well as in every other industrial calling success will be largely in proportion to individual effort.

One part of the farm or rather we should say one of these farms, was occupied by Mr. Russell's son. The one managed by Mr. Russell was the old homestead. The buildings on this farm appeared to be large enough, but, yet like those on nearly all the farms we had inspected were far behind the best class of farm buildings in the more western counties. The dwelling house is pleasantly situated, and is all that could be required in a farm house of a well-to-do farmer occupying a large farm. Near the house on the south-east side the land falls abruptly, in this dell and on its steep sides are some very fine and large trees, adding much to the landscape on this fine property.

On the adjoining farm occupied by his son there is a nice trim set of buildings. Mr. Russell is a first-class all-round farmer, but the exceptionally strong features in his management are the raising of very superior Clyde horses, for which he realises high prices, leaving a large margin for profit; and the careful attention paid to the management and application of manure. No manure is left scattered around and wasting on these farms. No little trickling streams are to be seen carrying away the rich elements of plant food, but all hoarded and saved and protected, so that as far as possible, all that was made on the farm should be returned to the land in the best possible condition, and in a way likely to produce maximum results. When manure is not drawn from the yards in winter or used in some other way in early summer, there can be no manner of doubt but what Mr. Russell's practice of putting it into large compost heaps is the best that can be followed. Then again, this plan has the advantage of leaving clean and tidy yards during the summer, this in itself is no small consideration. We speak feelingly on this, for in many a barn-yard we had been in, while carrying out the work intrusted to us, our steps were taken with fear and trembling, and at least one of those engaged in the work used strong expressions which would hardly have done to have been addressed to the proprietors whose farms were being inspected.

If any of the readers of this report who happen to be amongst the class who attend so carelessly to this department of farm management will carefully think the matter over, and mend their ways, much benefit will have resulted from this farm competition.

In conclusion, we would say that it is most difficult to describe this farm; it is only a part of a very large one. But this we can say with certainty, that Mr. Russell owns a very fine property, that much labor has been judiciously expended upon it; wet lands have been underdrained, strong fences have been built, fields are being well cultivated, and not by any means the least important, when looked at in a larger way, an example is given of what can be done even in such a time of depression as the farmers of this country have experienced, when thrift, industry and intelligence are brought to bear on the operations of the farm. We place Mr. Russell amongst the most successful farmers in Ontario.

The reader may ask why then have you not awarded him the gold or silver medal. The answer is, that Mr. Russell's large property embraces a number of farms bought at different times. These were taken with all that was on them, the seeds of which are difficult to get rid of, and, while we have reason to believe that the wild mustard and thistles are disappearing before good cultivation, yet the fact remains that this farm is not as clean as those to which the prizes have been awarded, nor yet are the buildings as well adapted for carrying out successfully stock raising, feeding or dairying, some line of which to follow is essential to profitable farming. Then again, spreading his labour over such a large area, even admitting what is a fact, that Mr. Russell posesses good executive ability, makes it most difficult to attend to many of those little matters of detail which go to swell up the number of marks in a farm competition.

When we had finished looking over this farm time was pressing, otherwise we would gladly have accepted Mr. Russell's pressing invitation to stay to dinner, for it is always a pleasure to us to meet and talk with such men—men who have by their own successes and by their example, done much to raise Ontario to the position it now occupies, as the banner Province of the Dominion, in all that regards the excellence of its farming and the progressiveness of its farmers.

By the time the sun had reached the meridian we drove up to the farm of

MR. A. M. WESTINGTON, TOWNSHIP OF HAMILTON, WEST NORTHUMBERLAND.

This farm contains 156 acres. The soil is of a mixed character with heavy clay loam predominating. A large creek runs through the south-west corner, cutting off about ten acres, this, with a splendid flowing spring, about the centre of the property, makes it an exceptionally well watered farm. The field arrangement is very inconvenient. At the time of our visit, one large field had in it spring wheat, oats, barley, meadow, corn and buckwheat. However, it is only fair to say that Mr. Westington contemplates making changes, which when carried out, will make it very much more convenient as regards giving access to the fields and in handling stock in summer. The buildings are good and sufficient.

A ten mile drive going by the way of Camborne and Coldsprings, took us to the last farm to be seen for the day.

WM. WESTINGTON AND SONS, TOWNSHIP OF HAMILTON, WEST NORTHUMBERLAND.

Silver Medal.

Both your judges have had considerable experience in comparing farms, so it did not take us long to make up our minds that, this was either going to be a prize farm, or one that was going to mark high. It contains 200 acres, of which thirty are on woodland and shelter belts. These shelter belts, mostly of second growth timber, are much required on this farm, for without them it would be exposed to the north winds sweeping over Rice Lake. It is situated ten miles north-west of Cobourg. On the front or south side it lies on to the public road, having a depth of a mile and a quarter to Rice Lake, which forms its northern boundary. About midway between front and rear, the land rises to the highest point, forming the water shed, sloping to the front on one side and to the lake at the back.

A magnificent view is to be had from this high land in every direction. Looking to the north, the eye wanders over the above named lake with its many tree clad and partially cleared islands, varying in size from a few perches to those large enough to be occupied as farms. Away beyond these waters we look over the townships of Hamilton, Cavan and South Monaghan, and to the south-west the township of Hope. As we turn to the east bordering on the lake, at that side a good view is obtained of the township Alnwick, and to the south east are to be seen the poor and sandy hills of Haldimand. These grand sights of lake and hill, cultivated fields and wooded plain, forms one of those fine landscape views which tends to make travelling in these counties in summer and autumn so delightful to the lover of fine scenery.

Going back to the work proper in which we were engaged, we found many very strong features in the management of this farm. The system of tillage was very thorough, the fields clean and free from weeds, the clearing away of obstructions to cultivation had been well attended to, the stone taken off the land, instead of being left in unsightly heaps, to be a nuisance in every field, had been utilized by being put into well built dry stone dykes. The back part of the farm bordering on the lake, was very much broken with steep hills. Wherever the hills were of little value as arable land the original timber had been wisely left, and the valleys where the land was rich, from the washings of these hills for countless ages, had been cleared and were being used in the most profitable way as pasture lands.

Eight milch cows and about twenty-five young cattle is the number of cattle usually composing the herd. These are all either pedigreed shorthorns or high brod grades of a very good type. Twelve horses including a carriage stallion, winner of the second prize in the three year old class, at the Toronto Industrial, 1888. The flock of sheep comprised sixty pretty well bred Leicesters. This flock showed that considerable attention had been paid to the breeding. Not much is done in raising or fattening hogs, but those kept are like all the other stock well attended to. In stock management these gentlemen mark high. The area of the different crops grown is: wheat, twenty-five acres; oats, twelve; peas, twelve; barley, thirty; roots and other hoed crops, eight; pasture, forty and meadow forty. The system of preparing the land for the different crops is very similar to that on other well managed farms already described. This we might say, that the Messrs. Westington, like the owners of every clean and well kept farm that we have ever been on, put a good deal of work on their land. They have never found out any patent way of keeping their farm clean and in good tilth without it.

It was only after careful consideration, that we finally decided that this farm was a shade behind the one, the owner of which was awarded the gold medal. It was an exceedingly close second. There was a great similarity in this, that neither of them was *exceptionally* strong in any one line, but on the other hand they were both strong, if not markedly so, in every department of farm management.

Late at night we reached Cobourg, leaving again on the 11.15 p.m. train for Belleville, pleased that the next day was Sunday, and happy in the thought, that there was to be one day without the usual forty or fifty mile drive.

On Monday morning an early start was made, this time for the township of Thurlow. Taking a north-easterly course, skirting the Moira (which is here a large and wide stream) for four miles, passing the little hamlet of Canifton, we drove on a well made road to the village of Corbyville where is located the large mills and distillery, taking their name, like that of the village, from the proprietor. From this point we struck off to the east, passing through a rather poor farming section, and after a rapid and enjoyable drive pulled up at the farm of

Mr. W. A. Martin, Township of Thurlow, East Hastings.

This farm comprises 100 acres, of which fifteen is wood land. The soil is a strong clay loam, and under its present management is very productive. All the crops were heavy. The fences had an untidy look from the quantity of stone piled along them. The dwelling house is first-class, and the barn buildings suitable. The field management as regards cultivation appeared to be good. Particular attention is paid to the garden, and as a result, it was far above that of the average farmer. Quite a number of cows are kept, the milk being sent to the cheese factory. This property has been much improved by underdraining. Mr. Martin is a good farmer, but there is nothing in the management out of the ordinary line of well managed farms calling for special remark.

Again on the road, this time to

Mr. J. O. Huffman's Farm, Township of Thurlow, East Hastings.

Gold Medal.

This property is divided by the public road, leaving 26 acres on the north side and 74 on the south. On the smaller portion are the buildings, garden and orchard. Besides this orchard is another on the opposite side of the road, both of which are admirably managed, the trees being clean, carefully pruned and vigorous looking. The soil is a strong clay loam, thoroughly underdrained wherever required, not only the fields but the yards and about the buildings, these being situated on land naturally wet, and is now, as well as garden, paddocks and orchard, cleared of all surplus moisture, and when the frost goes out in the spring are quickly dry.

The fields are fenced with post and wire, post and board, and substantial rail fences. The gates, wherever required, are well hung and in good shape. The farm being narrow, only 40 rods, it was thought best to have the private road on one side as far back as required to give access to the wood land on the south side and to the near side of the last field on the north side of the farm. This rear portion is used as a permanent pasture, and is all the more valuable for that purpose on account of having a creek running through one corner. The 74 acres on the south side comprise two fields of 8 acres each, three of 10, one of 13, and at the extreme back part 15 acres of woodland. On the opposite side is a field of 11 acres, one of 8, the balance being taken up with paddocks, yards, orchard, garden and private road.

With the exception of the meadow, the crops growing at the time of our visit promised a heavy return, with a more than a usual quantity of straw for the season. A field of barley particularly bulky. The whole farm was exceedingly well tilled, and as a result, the land was clean and free from weeds, all the available plant food going to produce paying crops, instead, as is often the case on many ill tilled farms, of being divided up so that a large percentage goes to growing noxious weeds. The principal crops grown are fall wheat, barley, oats and corn, there being this season 12 acres of fall wheat; barley, 10 acres; oats, 9; corn, 6, and a small piece in roots; meadow, 23 acres. The wheat and part of the barley is sold, the quantity of the latter sold or consumed depending upon the price, all the rest of the grain, roots and hay is consumed on the farm. Mr. Huffman depends largely upon fall cultivation for keeping the land free from weeds and thistles. As the grain crops are off the plow and harrows are put to the work, a great deal of work being put on the land before October. Later they are plowed deeply. Occasionally green crops are plowed under, but the main dependence for keeping up the fertility of the soil is upon farm yard manure.

The principal business in stock is dairying, the milk being sent to the factory. All cows which are not up to a high standard as milkers are fattened and sold for beef. Those on hand are a fine lot, and, although not classed as Ayrshires, are a good deal of that type, resembling heavy milkers of that breed. Several of the cows were milkers of a high order. The system of summer feeding is in accordance with the practice of the best dairymen. Whenever the pasture becomes short or dry and less nutritious, it is supplemented by cut green fodder, the aim being to supply the cows with full rations of milk-producing food during the whole milking season. It is a matter of surprise that the farmers generally in these dairying districts, are not more alive to the importance of liberal feeding. It has invariably been the case that wherever we have met the highly successful dairyman—not only this year, but in every former year when carrying out similar work—we have found that his success was quite as much owing to liberal feeding as to the judicious selection of cows. But the fact is, that, generally speaking, the man who knows enough to keep nothing but heavy milkers may be depended upon for knowing enough to make the most out of them after he has got them.

The seven horses, young and old, were pretty smooth, but rather light. They were of the stamp that, if bred to a first-class coaching stallion, would be likely to bring good saleable horses.

The woodland, like everything else on this farm, was carefully attended to. All the dead and dying timber was regularly cleaned out and used for fuel. There was a fine growth of young trees, giving a healthy, fresh look to this valuable part of the property.

The barn buildings are well constructed, and special attention has been given when planning them to economy of labor and convenience in feeding the stock and handling the produce of the farm. The dwelling house is a snug looking farm house, built of brick, a storey and a half high, surrounded by lawn and garden and neatly kept grounds. The small lawn in front with its few well kept flower beds and the flowering and other shrubs dotted about here and there, enclosed with a neat and nicely painted fence, gave it the look of a very pleasant home—just such a place as makes our city cousins think that life after all might, under such conditions, be endurable in the country. The vegetable garden was perfect in its way. Vegetables of many sorts, with a large supply of small fruits, were to be seen there. How much many farmers miss by not paying a little more attention to this department. The orchards were in hoed crops, faultlessly clean, and the trees in fine shape.

The out-buildings include two barns fitted up with slings—and, by the way, we may say that the plan of unloading with slings appears to answer admirably. Wherever we have found them in use the owners have invariably spoken highly of them, and speak of them as working smoothly and saving much labor, as well as getting through with the work much more rapidly than by the old plan of pitching. The horse and cattle stables are convenient, well arranged and suitable. Pig-pens, fowl house, wood shed and implement house not a fault could be found with. The last named, with its roomy loft for storing away the smaller things, is a model of what such a building ought to be.

As already said, we have, after careful consideration, decided to recommend that Mr. J. O. Huffman be awarded the gold medal for the best managed farm in this year's competition. This gold medal farm was at one time classed as a very poor one. It is now highly productive. Sour and wet land has been underdrained, and is now dry and fertile. First-class cultivation and judicious management have kept the land up to a high state of productiveness, enabling the proprietor to reap heavy and remunerative crops. The stock, while not boasting of the blue blood that can be traced back to many a noted ancestor, is yet good in its way. The orchard and the garden are each drawn upon to swell up the profits of the farm, and so managed that the best possible results are obtained from them. Mr. Huffman, by his practice, shows unmistakably that he fully realises the truth of the adage, "Whatever is worth doing, is worth doing well."

Mr. G. N. Clare's Farm, Township of Hungerford, East Hastings.

A sharp drive of an hour and a half brought us to this farm. On the way we passed through the bright little village of Roslin, and then on to Thomasburgh. This being the only farm entered (although it turned out afterwards that others had been entered, but through some mistake we had not up to that time received the entries), and as we saw at a glance that it would not come in for any of the higher prizes, we did not think it necessary to spend very much time on it further than taking a general look over it. About 20 cows are kept, the milk being sent to the cheese factory, the average per cow for the season being about $25. The factory is close to this farm, and for the last three years Mr. Clare has bought the whey, which he uses in fattening pigs. These pigs are fed in a small enclosure, the manure being entirely wasted—not a good practice, we thought. The crops we found to be quite up to an average, and the farm in fairly good shape.

By the time we got through with our work here a reference to the time table made it very clear that if we expected to catch the train for Madoc (our next base of operations) that night, we had no time to waste. So off we started our driver, an intelligent young French-Canadian who had come with us from Belleville, having before we started made himself acquainted with the road to be travelled. Driving for about five miles it was observable that the road showed signs of being very little travelled, and had been getting noticeably rougher until it had become almost unfit to drive on, being but little better than a bed of stones, and so worthless was the land on either side that it would seem almost impossible for any man to make a living upon it, taking this in connection with the dreary look of all around, we began to be strongly impressed with the idea that we were fast reaching the point "where the last man lived," and as it turned out so we were, for soon after we came butt up against a tamarac swamp through which a road had never been made. Then for once our French Canadian lost his temper, remarking that he would just like to get two minutes at the fellow who directed him to turn to the right at the second concession. It is to be hoped that he did not meet him on the way back. Nothing else for it now but to retrace, put on more speed, and try yet to reach Cookstown in time for the night train. An extra fifty cents was promised our driver, and after a very long day's drive we dashed up to the back of the station just as the train put on brakes in front. No time for tickets, but boarded our car and in due course of time were hanging up our coats in the hotel at Madoc.

Mr. Thomas Caskey's Farm, Township of Madoc, North Hastings—

Bronze Medal.

Taking the Madoc and Bridgewater road for a mile and a half we came to this farm. It is divided by the road, 100 acres lying on the north side and fifty on the south, 12 acres on the south lying down near Moira lake is in wood. A fairly good private road runs through the centre of both places, gates opening on to this road from the fields on each side. The dwelling house and one set of barn buildings is situated on the south side and another set of outbuildings on the 100 acres on the opposite side. The fifty acres run back close to Moira lake; this portion is also divided by the railroad, about half of this lot lying between the R. R. and the lake is somewhat rocky and better suited for pasture than for tillage, for that reason and also because there is on it a never failing spring it is always used as pasture. The balance of this portion was bearing at the time of our visit heavy crops of fall and spring wheat.

On the north side were fields of grain and hay, the latter having been partly housed the crops were all good, one field of hay exceptionally heavy for the season. From 18 to 20 cows are kept, the milk being sent to the cheese factory. Taking it altogether this is a pretty well managed farm.

At 10 a.m. on July 7th we climbed into a lumbering old stage under a steady downpour of rain, and after the driver had collected sundry passengers and many parcels in different parts of the village, we went off with a rush, but as this five-mile-an-hour pace could not be kept up for the whole distance to be travelled it being six miles to Eldorado, the station at which we were to take the train for Rathbun, our Jehu thought it best to slow down to three miles an hour. From the time of starting we drove continuously through rough and rocky land, passing close by the hematite mine at one time a busy scene. but now with its works rotting down. Eldorado, of high sounding name, and close to the Richardson gold mine where a little gold was taken out and very much more put in which is not likely ever to come out again, is a miserable place. We had here a weary wait, and as we could not get much satisfaction from the agent as to the probable time that the train would be along. we began to fear that it might be that it had ben cancelled for a few days, and to consider whether it might not be necessary for the younger member of the judging committee to push on afoot to the back townships where our work lay, the other member having very kindly offered to remain behind and look after the baggage until he returned. At last, however, a train of empty flat cars with a passenger car attached to the rear came slowly in, our spirits went up and off we went through swamps and rocky ridges, until Bannockburn was reached. The land was fairly well suited for stock farming. From this point to Millbridge the rock came to the surface everywhere over the dry land it being absolutely and entirely worthless for farming purposes ; no sign of cultivated field anywhere. Leaving Millbridge a few fields were to be seen bearing scanty crops which will give to the grower but little return for the labour expended. Then again through a yet more dreary and barren section, with the road built in some places over deep quagmires, ever and anon, passing by the forsaken cabin of the railroad navvy and the lumberman, with here and there to be seen the rotting skidways telling of an industry of the past. At Gilmore the Caverley saw-mills gave a little more life to the surroundings. Here were vast numbers of logs which had been floated down the Beaver Creek from the yet unculled forest far up the stream. From this point passing St. Ola to Rathbun the country becomes less rugged. Occasionally fenced fields were to be seen amidst the rocky surroundings with the owner's primitive shanty or small log house coming to view as the train rushed by, with, at long intervals the more pretentious little frame dwelling.

Leaving Rathbun by stage at 2.30 p.m. a three hours drive brought us to Walkerville, a place of eight or ten houses, including two taverns and a small store. Fifteen minutes after reaching this place one of your judges might have been seen sitting on a very rough bench at the door of what by courtesy is termed the hotel, waiting for his friend to come back from what he feared might be a fruitless search after some one to drive us the next 22 miles to Carlow. The last three hours we had been driving in North Hastings had taken us through a part of the country absolutely and entirely worthless for agricultural purposes, up one steep hill and down another, rocks and stones everywhere ; we know something now about colonisation roads.

Finding that it was quite impossible to get any further that evening and knowing by this time that it was going to take two days, if not three, to finish up the work at Carlow and get through to Renfrew, it was thought advisable for one of us to go on to this out-of-the-way place and the other push on to Renfrew. This being settled the next thing to be considered was the best way of getting back to Rathbun, so as to be in time for the 7 a.m. train next morning. Negotiations were opened with a farmer who was staying over night at the hotel, a bargain was finally struck resulting in one of your judges leaving next morning in a lumber waggon at 3 a.m. reaching the station half an hour ahead of time.

The same morning, a little after, his associate started off in the opposite direction in another waggon engaged to drive him to to the first of the farms to be seen in the Township of Carlow, reaching it about noon. The road travelled was a very rough one and may be described as almost continuous ascents and descents through what the settlers call mountains.

MR. JOHN MACKEY'S FARM, TOWNSHIP OF CARLOW, NORTH HASTINGS.

Bronze Medal.

It contains 100 acres, 40 acres of it being in grain and 34 in grass. The entire front of this farm was fenced with post and wire fencing and it may be described as an exceedingly neat place and very well kept. The buildings were also good and the crops moderately clean, in fact it was one of the neatest farms visited this year. Although it was neat and moderately clean it was quite evident that it was heavily cropped and that the grain was not fed on the farm. The stock kept consisted of seven cows, four calves, twenty-eight sheep and five horses.

The cattle were a common lot, a grade bull being used. The sheep were much better and of fair quality, but the horses were as poor as the cattle. The proprietor claimed he cleared about $100 in his farm operations during the year. About a mile from this farm was

MR. W. C. PARKHURST'S FARM, TOWNSHIP OF CARLOW, NORTH HASTINGS.

The part shown comprised 100 acres The crops here were very good, better than on any other farm shown in Mayo or Carlow. The approach to the house was very nice, but the buildings were poor in the extreme, too poor to receive an award. Had they been as good as Mr. McKay's he would have won the silver medal for that section of country.

MR. JOHN CAMPBELL'S FARM, TOWNSHIPS OF MAYO AND CARLOW, NORTH HASTINGS.

Bronze Medal.

Leaving Mr. Parkhurst's farm a five-mile drive had to be taken to reach the abovementioned farm. This was a 200 acre farm, a rough stony place on the York branch of the Madawaska. It had been an old lumbering station at one time. The buildings were good, being of hewn logs and were ample for a farm of this size. Mr. Campbell is building a good house, and has in other ways much improved this property since coming on it. His cattle were thin, and a thoroughbred Shorthorn bull used on the herd looked as if he might have been a much better looking animal if he had been more fully developed by good feeding; he was rough and thin. The proprietor has done a great deal in the way of removing stumps and stones and has been successful in making considerable money; in fact we think for the chances he has had that he has done wonders. Mr. Campbell is an enterprising, energetic and intelligent man. and his social conditions are fairly good. His farm, however, is not by any means clean or free from weeds, thistles and ox-eye daisies drawing heavily on the plant food of the soil and interfering very much with the successful growing of the farm crops. In speaking of the three farms in this outlying district we consider that none of these farms were good enough in any particular to have a decided ascendancy over the other competitors. We would, however, recommend that Mr. Campbell be given the bronze medal for energetic farm management, and especially for his mode of handling his stock during the winter months, and for the active part he has taken in improving his live stock by the introduction of pure bred animals; and although his winter management cannot be considered in some respects first rate it is much better than that usually practiced in this vicinity. Mr. McKay we would recommend to receive the bronze medal for the neatness and exactness with which he keeps his farm and buildings. While, apparently, Mr. Campbell is making more money by farming than Mr. McKay the latter gentleman has done much more to improve his place. Further, had Mr. McKay managed his stock as well as Mr. Campbell he would have stood so far to the front that we would have been in favor of giving only one bronze medal, but his winter mangement was so exceedingly faulty, allowing as he did his cattle to run in open sheds and fed them in the farmyard during the entire season, and allowing to a greater or less extent the free mingling of cattle and sheep.

Mr. Parkhurst on the other hand has many strong points in his management and would have stood a good chance for first place, but his buildings were so decidedly poor and unsuitable that we could not overlook that fact when making the awards. This gentleman, who is Secretary of the Agricultural Association, deserves great credit for the part he took in obtaining competitors and also in assisting the farmers to introduce through the Agricultural Society pure bred animals in the district. The morning following the finishing up of the work in Mayo and Carlow a start was made at 3:30 a.m. and at 9 p.m. on the same night your judges again met in Kingston.

As already said when we parted company at Walkerville on the 7th one of your judges went on to Renfrew reaching that town by the way of the K. and P. Railway. The six farms entered in this county were seen the same evening and the next day. It may be here said that these same farms were inspected by the other judge a few weeks later, and before this report was written, or awards made, the strong and weak points in the management of the different competitors were fully discussed, and we may add that we had no little difficulty in coming to a decision, especially in regard to the placing of Mr. Martin and Mr. Airth, your judges hardly seeing eye to eye in the matter.

MR. JAMES MARTIN'S FARM, TOWNSHIP OF HORTON, SOUTH RENFREW.

Bronze Medal.

This farm is situated 2½ miles N.E. of Renfrew. Driving on the public road along the front, and then up the privat road to the buildings enough was seen to make it clear that this farm was managed by a first-class farmer. On closer examination first impressions were more than borne out. It was not because the crops were exceptionally good that this farm as regards field management takes a high place in the competition. On the contrary some of the grain crops had suffered very much from frost and drouth, more from frost than any that we had so far inspected. But the more we examined into the system of farming followed out, and the nature of soil to be dealt with, the more we were convinced that Mr. Martin's system was founded on sound principles, and that this was a more than usually unfavorable season for this particular farm.

The soil may be termed a clay loam which on some parts of the farm inclines to stiffest clay overlaying a marly clay sub-soil. The fields while not altogether free from thistles are sufficiently so to enable us to speak of it as a clean farm. The cultivation is far superior to that on the average of what may be spoken of as well tilled farms, and it may be added that much of this land has been brought under cultivation within the last few years, thus making it much more difficult to contend against the weeds while the stumps are still in the fields. We might further say, while speaking of the lately cleared land which has only been cropped for a few years that there is little doubt that this accounts in a large measure for the injury done by frost, and when the loose and porous surface soil of the level and low-lying fields becomes more mixed with the clay beneath, that the crops will be much less likely to suffer injury from this cause. It was quite noticeable that the crops were more injured in those fields where the light surface soil prevailed. However, making all allowance for this, and taking the crops all around, they were well up with the average of those seen on the other farms. A field of corn well put in was especially strong and forward, and the root crop was the most advanced we had seen.

The improvements along every line on this farm represent a great deal of judiciously expended labor and money, perhaps in no way more so than in the great amount of underdraining done, the total length being 1,044 rods of covered drains, and these have all been put in within the last 13 or 14 years; rather more than half of the entire length has been laid with tile from 3 to 5 inches; all those which will be put in in the future by

Mr. Martin will be with tile. Those made in the earlier years were of stone ; at different times a few branch drains were made where there was a firm clay bottom by digging out a groove in the middle of the drain at the bottom and laying a green sawn slab lengthways over it. Those made in that way 10 or 12 years ago are still working well. The total acreage of this farm is 250 acres of which about 50 is bush. The woodland comprises those portions which are rocky and unsuitable for cultivation. This was all the more noticeable to us for the reason that we had been on many farms during the time our work of judging was going on where the owners had made the mistake of clearing portions of their farms often with the expenditure of great labor when the land was almost valueless after the work had been done, and in not a few cases did it appear to be an absolute injury, cutting down what would have been valuable wind-breaks and turning the land into a breeding ground for grasshoppers.

The following is the average of the crops : 22 acres of wheat (spring), 15 peas, 5 oats, 15 peas and oats and barley mixed at the rate of $\frac{1}{3}$ peas and barley to $\frac{2}{3}$ of oats. The grain from this is all ground and mixed with cut feed and bran and fed to the stock in winter ; 2 acres of barley, $5\frac{1}{2}$ corn, 7 turnips, $4\frac{1}{2}$ potatoes $\frac{3}{4}$ of an acre of mangels, $\frac{3}{4}$ of an acre carrots, $\frac{1}{2}$ an acre of flax, 55 in meadows and 60 in pasture. With the exception of wheat and sometimes an occasional sale for seed of the other grains it is nearly all fed upon the farm. When hay is sold it is usually replaced with the same number of tons of bran. Fodder is nearly all passed through the chaff cutter, hay, straw and corn being mixed and supplemented with bran and meal.

The management of the manure is to draw out to the fields and put in piles what is made in the winter ; what is made in early spring and until the stock go out, which is generally about the 20th of May, is used for the turnip crop. Mr. Martin in preparing for the root crop always puts the manure directly in the drills, a practice followed by some good farmers, but the plan is certainly open to a good deal of objection. However, it is not within our province now to discuss it.

A plan followed sometimes by Mr. Martin in the way of green manuring has in it a good deal to recommend it. It is to sow clover with the grain on the land that is to be summer fallowed the next season, plow under about the latter end of June, and then two more plowings preparatory to sowing wheat.

The fences are mainly straight cedar log very well built. The other fences excepting around the buildings, yards, etc., common rail with a piece of Russell fence enclosing one of the wood lots. Those around the paddocks, yards and garden are post and board and picket fence, strongly and neatly put up with not a ragged thing about them. The private roads give easy access to every field and are in excellent shape : we have seldom seen a farm better arranged in this way. More than ordinary attention has been paid to the orchard and garden. The barn buildings form three sides of a square with the yard opening to the south ; the buildings are very extensive and are built of cedar log.

To the farmers in some of the more western counties where splendid bank barns are the rule, on many of these farms the entire set of buildings costing almost as much and in not a few cases more than the value of the land, the mention of log buildings will be apt to convey to them the idea that the farmers owning them are a long way behind and they will not unlikely associate these buildings in their minds with the somewhat primitive ones which they had torn down to make room for the new. If so, we may tell them that down in these counties you occasionally strike farms where the farm buildings are of log and for all practical purposes are as good, or very nearly so as many of those which are considered first class bank barns, and in interior arrangements are quite equal to many of them. Not only that, but when built as Mr. Martin's are, of carefully selected cedar logs of an even size, neatly put up and well finished in every respect, and sufficiently high to make the use of the hay fork an important factor for carrying on the work of haying and harvest, we then think that they should not detract much from a farmers chance in a farm competition even when compared with the modern buildings which are so common in many of the other counties. The stables are fitted up in a way that might be taken as a model by many farmers in the best stock raising districts of Ontario. Even the matter of having the water supply to the stock in the stables has not been overlooked.

there being a trough in front of the cattle supplying them with water which is covered when not in use to prevent dirt from getting in. And what may be taken as a pointer by nearly all our farmers, the inside of these stables were as clean and white as lime could make them. The horse stable opens into a yard with a high close board fence separating the horses entirly from all the other stock, all the yards and paddocks adjacent to the buildings are clean, neat and tidy. In this connection may be mentioned another building, a snug little house at some distance from the homestead which is occupied by a married man in the employ of Mr. Martin. The stock at the time of our visit comprised 8 horses including three colts bred from Clydesdale sires, 20 cattle (10 of these cows) the balance yearlings and calves. The stock of cattle in the summer on this farm is usually small, the feeders being bought later in the season; from ten to sometimes as high as twenty-five yearly are fattened. The cows mostly calve in the fall, or early winter, butter making being carried on until the cheese factory begins operations, when the summer's milk is sent there. This system of using the milk is found to be more profitable than depending solely on summer dairying.

The flock of sheep consisted of 40 over one year, and 35 lambs. These sheep are of a good type. The foundation of this flock was longwools, but these have been crossed for several years with good Shropshires, and this practice has been kept up until he now has a lot of sheep of Shropshire type and of fine character. The lambs are sold for from $6 to $10, with a ready market for all that can be raised. There is no manner of doubt whatever that in the wisdom of using good males depends to a great extent the prosperity of our farmers throughout the country wherever stock raising is made a leading feature in farming let it be either for the dairy or shambles.

In conclusion we would say that in almost any other county, perhaps with the exception of one that comprised this year's group, he would have easily come in for the silver medal, but in his riding it happened that he had one of the very strongest men in the whole group to compete against. We have no hesitation in saying that Mr. Martin is a splended farmer.

The next farm to be seen was adjoining the one just described and a few minutes' drive took us to it, in fact we had driven along three sides of it before going to Mr. Martin's and in that way had had a pretty good view of a great part of it.

MR. JOHN AIRTH'S FARM, TOWNSHIP OF HORTON, SOUTH RENFREW.

Silver Medal.

This farm, consisting of 200 acres was awarded the second silver medal in the competition of 1885, and Mr. Airth was again a competitor the following year for the grand sweepstakes. A small portion of this farm is rocky and on this part the original timber is still standing. The C. P. R. runs through the south corner cutting off 75 acres, 25 acres have been left in wood on this side where the land as already said is too rocky for arable farming. The surface soil on the rest of the farm is clay loam with a free clay subsoil.

A somewhat deep ravine runs near the front of the house and along the back of the barn buildings. This, while being a slight disadvantage looking at it from a practical standpoint, is pleasing to the eye and picturesque. On the bank of this ravine the second growth timber has been protected as well as considerable planting having been done. This not only adds to the beauty of this part of the farm but also forms a wide break and shelter for the buildings. Besides the planting already spoken of a beautiful row of trees is now growing all around the farm. If farmers generally were to do what Mr. Airth and Mr. Martin have done in the matter of planting the rough and rugged spots on their farms, and would leave the growing timber standing on those parts that would be valueless, or nearly so if cleared, it would add much to the rural beauty of our fair Province where otherwise there would be but the dreariness of a lonely desolation.

This property has been very much improved by draining not less than 1,000 rods having been put down. Without elaborating on the cultivation it may be said to be very thorough, and as a consequence the land is clean and free from thistles and noxious weeds. Like that of every farmer whose farm we inspected, and whose land was found to be exceptionally clean, the practice is as well as putting a good deal of work on the land at other times to depend mainly upon early fall cultivation for keeping down and getting clear of weeds. This practice of making fall working take the place of the naked fallow we have found to be steadily growing of late years.

Mr. Airth has no fixed rotation. In former years it was a four years course, being peas upon sod, fall wheat after peas, then two crops of oats. As fall wheat has not been found to be a paying crop of late years in that section a different system has to be followed out. The acreage of the crops this year is 18 acres of spring wheat, 27 of oats, 14 of peas, 40 acres of hay, 5 acres of roots, 3½ Hungarian grass, 1 acre silo corn, and 45 acres pasture. Wheat is the only grain which is regularly sold off the farm; most of the coarse grains are fed to the stock and hay is seldom sold. However, we hardly required to be told that; a very large pile of well rotted manure and the luxuriant crops were sufficient evidence that the crops grown on this farm mainly took the shape of beef, mutton and dairy products before being marketed.

The practice followed in handling the manure, is, when used on a summer fallow to draw directly from the yard and plow under in the early part of the season, and that which is going to be applied on the land intended for roots the following season is hauled out and piled up, care being taken to have it well tramped and drenched with all the liquid manure obtainable. This is done partly with the object of preventing fire fang.

Like his neighbor whose farm we had just left, Mr. Airth has had some experience in plowing under green crops, and in his case also the clover was found to give the most satisfactory results. The manure pile, however, is the mainstay on both these highly tilled and well managed farms. With the late Mr. Michie, of Tiptree Hall, Mr. Airth has found out that "a good field of roots, a good herd of cattle, and a good manure pile means a good field of wheat."

What struck us as rather a weak point was the lack of good field arrangement, although we admit the correctness of the idea held by Mr. Airth when he says he "approves of doing away as much as possible with fences and gates as they are expensive and troublesome and harbor weeds and rubbish." But while that is quite true when carried out to a certain extent, and under conditions favoring it, it is also equally true that until soiling becomes more general it is an advantage in having a farm properly divided into fields with a convenient way of reaching them, and in Mr. Airth's farm this is somewhat lacking. The buildings are cedar log, strong, substantial and durable. The fences are mostly cedar log and well built.

The stock on hand this summer comprise 35 head of cattle, 14 of these being milch cows, 31 sheep, 6 horses and 12 pigs. Fifty-two cattle were carried over last winter. The milk is sent to the cheese factory during the season and the balance of the time butter is made; from the two sources from $37 to $38 a year is realised. Quite a number of cattle are fattened every year, and in breeding and fattening a leading consideration on this farm is to have all animals in the best possible shape before being offered for sale. Mr. Airth wisely says, what every really successful stock man knows, that "the finishing process is where the money comes in."

In winter feeding all fodder is cut and turnips pulped; this is mixed and crushed, and fed in accordance with the requirements of the different classes of cattle. The milch cows are fed three times a day, and those being fattened four times. The sheep are a good lot, and like the cattle are carefully bred and well attended. In summer feeding, the aim always is to have a full supply of pasture during the growing season, with provision made for supplementing it in a dry time, and in the fall. For this purpose oats and peas mixed and silo corn are sown.

In every line of stock pure bred sires of good type are always used. The stock management on this farm is exceptionally good, and as a result maximum profits are realised. Some years ago, grade Shorthorns were kept, but coming to the conclusion, whether rightly or wrongly, that the Holstein were a better breed for that section of country (cheese making being carried on extensively), Mr. Airth bought a Holstein bull, paying a high price for it, and has persistently bred Holstein ever since, and now has a herd of considerable size of typical Holsteins. So well up on the points are they, that it is questionable if a breeder of Holsteins could go among them, without being previously enlightened, and determine that they were not pure breds. From what we have said, we do not wish to be understood as advising the breeding of this class of cattle, for as a matter of fact we don't like them at all; we are simply showing that Mr. Airth is carrying out stock-breeding on sound and correct principles.

As was once said before, when this farm was reported on, Mr. Airth is a first-class farmer, and one, who is not only succeeding well himself, but by example is exercising an influence for good in awakening in the minds of others the advantages to be derived from carrying out a higher system of farming.

Across on the other side of the road is

Mr. John Gibbons' Farm, Township of Horton, South Renfrew.

That part entered contains 250 acres, of which a considerable portion is bush. It has a frontage on the public road of seventy chains. The woodland is on the back part of the farm, and runs down to the Bonnechere river which forms the rear boundary of the property. The scenery along the west side is very picturesque. Standing on the bank and looking across are the granite hills, towering high above the surrounding country, and as we look down into the gorge 150 feet below we see the deep waters of Bonnechere flowing towards the great lakes, with the trees on its rugged banks throwing their great shadows on its smooth surface.

The farm is well fenced with straight log and rail fences; of the former there is not less than two and a half miles. Looking at this property as seen from the public road along its whole length, there isth at look of trimness and finish about it that at once attracts the eye, but when carefully going over the whole farm the back range of fields are found to be not nearly in as good shape as those bordering on the road. A great deal of labour has been expended on this farm. Being originally timbered with pine the stumps had all to be taken out as well as an immense quantity of large stone to be taken off. These obstructions to cultivation having been removed the casual observer could hardly realise the labor performed and the money expended on it. The land, generally speaking, is free from noxious weeds and, as far as we could judge, draining has been done wherever the nature of the land required it.

The homestead is fairly good. The dwelling house and other necessary buildings connected with it are not only suitable and well constructed, but they indicate unmistakably that Mr. Gibbons is a man of fine taste. The orchard, garden and surroundings generally have been laid out with an eye to the beautiful as well as to the useful. A noticeable feature is a very handsome grove of evergreens on the west side of the house, and a nice selection of ornamental trees. Mr. Gibbons, although not a winner of a medal is a hard man to compete against.

By the time we had climbed up the steep banks from the valley of the river, after having gone pretty well all over the farm, night was settling down, and there was at least one tired man, who was glad to reach the tableland out from among the thickly growing timber. It was eighteen hours from the time we had climbed into the waggon at Walkerville for our early morning drive, half an hour more and we were giving instructions at the hotel to be called at four o'clock the next morning.

Mr. Donald Campbell's Farm, Township of Admaston, South Renfrew.

Bronze Medal.

After an enjoyable drive of six miles, and while the dews were yet heavy on the fields, we were taking in the worth of Mr. Campbell's farm. Our morning drive had taken us in an opposite direction from Renfrew to that taken to see the three farms in the township of Horton. This farm contains 300 acres, a considerable portion of which required to be drained. The exact length of drains put down being 1,491 rods, costing on an average about seventy cents per rod. This property would have been of but little value to any one not posessing a good deal of pluck. It is literally a made farm, for not only was a great part of it worthless until it was drained, but a vast amount of work was required and has been done on it in other ways. Immense quantities of stone have been taken off and built into dykes, and the timber was of that sort that the stumps would not have rotted for generations. These have in a large measure been taken off, and now the whole cleared part of the farm can be worked with any sort of farm machinery. The growing crops at the time of our visit were: wheat, fifty-seven acres; oats, thirty; peas, eighteen; a small area in potatoes, and seventy acres for hay; the balance of the farm being bushland and pasture. With the exception of wheat everything grown on the farm is fed to the stock.

The stock of the farm consists of six horses, eight milch cows, sixty three year olds and thirteen between the ages of one and two, and eight calves. Mr. Campbell's system of stock farming is to buy steers in the fall, winter them over mainly on straw and hay and pasture them the next season, selling off the grass. This summer fifty-six will be fattened that way and sold. Besides those fed at home, a number are put on rented pastures. This plan of handling cattle Mr. Campbell has found to be very profitable. However, we must not forget that, in this style of stock farming, success or failure (that is, other conditions being favorable) will mainly depend upon having a proper knowledge of what animals to select, and shrewdness in buying and selling. and, if we are not very much mistaken, Mr. Campbell posesses the knowledge, and, like most of his countrymen, is fully able to hold his own when it becomes a question of buying and selling.

Mr. Campbell stands well to the front as an advanced farmer along those lines which he follows out as a specialty. And while we do not by any means endorse his practice as a whole—on the contrary, we think his winter management of stock very faulty—yet he is so strong in some directions, more particularly in what he has done in reclaiming waste lands, and showing that even the poorer lands of this country can be handled at a profit if the work is wisely gone about, that, if only for this alone, he well deserves to mark high.

MR. PETER CAMPBELL'S FARM, TOWNSHIP OF ADMASTON, SOUTH RENFREW.

The march fence divides this property from Mr. Donald Campbell's. It is a fairly good 100 acre farm, bearing average crops. There is nothing, however, about the management that calls for special notice.

MR. GEORGE CARDIFF'S FARM, TOWNSHIP OF ADMASTON, SOUTH RENFREW.

This farm is situated about midway between Renfrew and the last farm we were at. Upon driving up to the house, which, by the way, is a very nice one, we were fortunate in finding Mr. Cardiff at home. We say fortunate, for the reason, that this being a 300 acre farm we knew well from past experience, that on these large farms an hour or two is often in a measure wasted during the time the proprietor is "being looked up." and on this particular day there was not much time to spare if Kingston was to be reached that night. Mr. Cardiff we found to be a most genial and intelligent man, as well as being a successful farmer, and while carrying out the work of inspecting his farm and inquiring into his system of management we also much enjoyed his company, and if we had not been so pressed for time would like to have had another hour or two with him.

Of the 300 acres seventy on the north side is low lying bushland. The soil is mainly sandy loam. A vast quantity of stone has been taken off this farm, and a great deal of draining has been done. The two or three fields as yet unimproved give one a very fair idea of the labour required to bring the farm into the present state.

Mr. Cardiff does a good deal in raising horses, not following any particular line of breeding but aiming to produce a general purpose horse. At the time of our visit there were quite a number on hand, the size of the farm considered, and these mostly pretty useful looking animals. A few years ago, there would have been a good deal of money in them, but now they are very difficult to sell, perhaps more so, because they do not belong to any particular class. There is generally a fair market for the best of any distinct line whether it be heavy draught, roadster, or carriage horse, but horses that do not fill the bill well in any class are hard to get rid of at any price when markets are dull.

The buildings are good and serviceable. The land comparatively free from weeds and well cultivated. What we consider a rather weak point in an otherwise well managed farm is the small quantity of stock kept—too little manure made. Mr. Cardiff had on one of his own fields this year a very good opportunity of observing the importance of keeping the land in good heart, for while walking across a field of spring wheat we noticed a very marked difference in the crop, and in asking him how this could be accounted for we were told, as we expected to be, that there was a little more manure put on that part of the field. The difference meant dollars an acre when it came to be thrashed and sold.

Leaving Renfrew by the noon train for Kingston over the Kingston and Pembroke railway we soon got into a wild region of stony ridge and little lakes, with granite rocks all round. For fifty miles or more, until the junction with the C.P.R. is reached, it is dreary and desolate. The forsaken and long disused shanty of the lumberman or railroad navvy occasionally to be seen as we rushed past made the forlorn scene look all the more desolate.

Late at night, on the 9th, we met again at Kingston one of your judges who had been doing the work in the Township of Carlow, having left that out-of-the-way place by waggon express at 3.30 a.m., driving thirty-seven miles to Rathbun the nearest station. The next morning we took steamer for Wolfe Island, landing at the village of Marysville and from there drove to the farm of

MR. ROMAIN MOSIER, TOWNSHIP OF WOLFE ISLAND, FRONTENAC.

We may say at the outset that from our observation, not only of the farms entered for competition, but of the general system of farming and state of the farms as seen while driving on the island, that a great change will require to be brought about before the farmers residing in that part of Frontenac can be classed amongst the progressive and advanced men of the profession.

Judging from the name, we expected to meet in Mr. Mosier a typical French-Canadian, but we found the gentleman, although tracing his descent on his father's side from those who left France many years ago and made Canada their home with not the slightest trace in feature or characteristics of those early settlers which is so marked in those who for generations have intermarried into the families of their own people. Remarking this, we were informed that intermarriage for a number of generations with the descendants of early settlers from Great Britain had left him a Frenchman only in name. Mr. Mosier is a live, active, energetic Canadian, with apparently lots of vim and push about him. He owns a fine farm of 200 acres of heavy strong land which, in our opinion, would make an exceedingly fine one if something more was done in underdraining. About five acres is original bush and second-growth timber.

The crops this season comprised: wheat, four acres; barley, twelve; peas, eight; oats and peas mixed twenty-nine; garden stuff, three; corn, eight; pasture, thirty-three, and meadows, 100 acres. The orchard takes up about three acres. The yield of grain would be about medium, and the cut of hay would be light, for here, like all other parts of Ontario the grass had been much hurt by spring and early summer frosts, and the long continued drouth. While walking over these hay fields and remarking on the injury done, Mr. Mosier, suddenly looking at the younger member of the party said, "Oh, boy, come over here and you will see some heavy grass." So the young man went and his associate headed off in another direction to take in the orchard and garden. Besides this year's cut of grass there were nearly 150 tons of old hay carried over on account of the exceptionally low prices last year. The thought struck us that a continuation of low prices for hay, perhaps in the long run, might not be all loss to the farmers of Wolfe Island, nor yet to many others.

The cattle were a mixed lot, the cows being quite equal to the grades in this and adjoining counties. Mr. Mosier is making the same mistake which we have already a number of times alluded to, that is, in not following some definite line of breeding, well considered and sticking to it. Some of the young stock showed unmistakably that they had a dash of Ayrshire blood. With these was running a grade Durham bull, and a very mean one he was. Then again, going into another field we were shown some more young stock, the sire of which had been a half bred Holstein. This mixed up breeding was all the more noticeable for the the reason that the cows were a pretty fair lot which, with judicious selection of bulls of some fixed type, would soon give the owner good cattle, that is, if properly fed and cared for, for that is a weak point with many of these farmers.

The buildings and fences were passably good, field arrangement bad, and the orchard neglected. We have no doubt however, but what Mr. Mosier has been making plenty of money in the past, but the system he is following is a very exhaustive one, and his farm shows unmistakable signs of the bad effect of the course of farming that is being followed.

Driving further along the same road we came to the farm of

Mr. Richard Moore, Township of Wolfe Island, Frontenac.

Bronze Medal.

This farm comprises 100 acres with a soil similar to the one we had just left, and the buildings of somewhat the same stamp, with nothing particular to be said about the fences. The cattle we found to be on the same dead level of nearly all those seen during the time our work was going on. In the pig-pens, however, were some good Suffolks, and a litter of younger ones which had been bred from a Berkshire sow were good types of that breed.

The grain crops, especially a large field of barley, looked very promising, and the roots were exceptionally well advanced for the season. The manure we found to be very much better managed than it usually is even on more pretentious farms. There are many good farmers in Ontario who might take Mr. Moore's system of handling it as a pattern and be gainers thereby. All the manure left over after using what was required for the spring crops and roots had been nicely piled up, all the different sorts being mixed in one pile. This plan has also the advantage which has been spoken of in another place of leaving the yards dry and clean.

This farm is not by any means free from thistles, yet with the exception of a pasture field it could hardly be called a dirty one It might further be added that like Mr. Mosier's it would be much benefited by draining. Both gentlemen have performed considerable labor with the view of getting off surface water, but, after all, on any farm that has not a very free subsoil this is only a make-shift. But it may be said that in Mr. Moore's case he cannot be expected to do the draining, as he is only a tenant, and we may add that we did not lose sight of that when making the award, for as well as being rather the best farmer as it stands, it is only reasonable to suppose that if he was the owner more would be done in the way of permanent improvements. Leaving Mr. Moore's we took a north-westerly direction for a few miles until we came to

Mr. George Wills' Farm, Township of Wolfe Island, Frontenac.

This gentleman owns and works 375 acres; 200 of this is comprised in what may be termed the home farm, the 175 acre farm being situated on Garden Island. Again we found the same uniformity of strong, heavy and productive land. A large part of these farms is in grass, some of which would give a heavy cut, the remainder and that much the larger part would give but a very scanty return, and even that made up in no small measure of quack grass, this having got a very firm hold on the farm. The grain crops were fair, one field of barley being heavy. The stock consists of about 40 cattle and 80 sheep and lambs. It has become quite monotonous writing about cattle, for with few exceptions we might have described those seen on most of the farms inspected as being very much alike.

The sheep are strong grades of no particular breeding, at one time using a Southdown ram for two or three years and then going back to a Leicester again. We presume, however, that well selected animals have been used, the sheep being strong and the lambs good. The buildings are fair, but not by any means first-class

A noticeable feature in the management of this farm is the employment of married men, two being employed the year round. Mr. Wills has comfortable houses for them, supplies them with the feed for a cow, land for vegetables, and also fuel. One of these houses, a neat little frame, sheltered and surrounded with a pretty little pine grove, looked quite picturesque. These men board themselves, are paid $20 a month in summer and $12 in winter, with the perquisite already mentioned. Mr. Wills has given this plan a fair trial, and finds it work highly satisfactory.

We do not like to find very much fault when doing this work, but we think it would hardly be doing it properly if we did not point out what we thought to be the weak as well as the strong points of the management of the different farms that came under our observation. Viewing it in this way, we think it a very weak point in the management of these farms, especially on the first and last visited on Wolfe Island, that so little stock is kept and so much hay sold. Take Mr. Wills as an illustration, only having some ten cattle and a little over twenty sheep to the 100 acres is altogether too few to keep the farm from rapidly weakening, especially when it is remembered that the greater part of all the timothy hay grown on a large average of the farm is always sold, leaving almost nothing behind. Think as they may, these farms although of strong soil and naturally productive will of a certainty gradually produce less and less if their system of farming is not radically changed.

We also think that Mr. Wills is making the mistake which is so common with many farmers, of spreading his labor over too much land. It struck us very forcibly that if 200 acres of the land were thoroughly cultivated and properly drained on those portions requiring it, it could easily be made to produce as much in money value as is now raised on the whole farm. Unquestionably the day has now come in Ontario when the owners of good tillable soils must do more in the direction of intensive farming. We can no longer afford to spread our labor over ill-tilled acres. The successful farmer of the future is certainly going to be the man who concentrates his efforts in producing more off a given area, which means, when intelligently carried out, the producing of a greater quantity at a less cost.

Referring again to the competition between these three farms, we may say it gave us considerable difficulty in coming to a decision. The final result being that we recommend that the township prize of a bronze medal be given to Mr. Richard Moore. For, while we think the system followed by Mr. Moore is likely to realise quite as large profits at the present time, we also think the mode of farming followed out is a little less exhaustive. And finally, it says something in his favor that he is a tenant farmer who has proved satisfactorily that even in these hard times he can keep his rent paid up and make a fair living besides.

Reaching the wharf just as the gangway was going to be pulled up, we were soon steaming across to the Limestone City. By evening train we went to Napanee, where having made inquiry about our route for the next day and finding that a long drive was before us, the most distant farm being twenty-nine miles from the town, and as we were exceedingly anxious to leave for home on the following evening, it was evident to us that another of those unpleasantly early starts would require to be made the next morning.

Leaving the town we passed through a well-farmed district giving ample evidence of the intelligence, thrift and industry of the yeomanry living in this part of Ontario. Driving alongby the banks of the Napanee river, and passing the village of Napanee Mills, we reached Newburgh, a nice trim village, clean looking and well built. The first farm we had to inspect lay on the outskirts of the village, and is owned by

MR. J. B. AYLESWORTH, VILLAGE OF NEWBURGH, ADDINGTON.

It comprises 160 acres of which 100 is under cultivation and about 60 in bush, timbered mainly with maple, beech, birch, cedar, ash, elm. and oak, having quite enough of fine, healthy maples to make a first-class sugar bush. This property is very nicely situated with a southern aspect ; the location of the buildings has been well chosen, standing upon the rising ground overlooking the village. From this point a grand view of the country away to the south, including the valley of the river, Napanee Mills, and Deseronto, then beyond and right across Prince Edward county until the eye rests, on a clear day, on the country around Picton, 40 miles distant.

Mr. Aylesworth has done much by judicious labor in improving this fine property, and with the exception of one field in which is a good limestone quarry, and which may be termed rocky, the whole cleared part of the farm is in good shape for cultivation. The crops grown are fall wheat, rye, oats, peas, corn and potatoes. Mr. Aylesworth pays a great deal of attention to keeping his grain clean, and as a result sells a large part of what is grown for seed.

At the time of our visit the stock on hand consisted of 7 horses, 13 cattle (all mulleys), 32 sheep, and a few pigs. The milk of the cows is sent to the factory, realising about $27 per cow, exclusive of what milk is used at home before the factory opens and after it closes. The buildings includes a very nice stone dwelling-house with attachments, and a very fair set of farm buildings. The fences medium. The water supply is from wells and a flowing spring on the south-east corner of the farm, convenient to the buildings.

Again taking the road we passed by the way of Camden East to

MR. WILLIAM DOLMAGE'S FARM, TOWNSHIP OF CAMDEN, ADDINGTON.

Bronze Medal.

This we found to be a 200 acre farm, with the public road dividing it so as to leave an even 100 acres on each side. On one side of the road is a very fine dwelling-house, hop-yard of four acres, drying house used for drying the hops, carriage and implement house. On the opposite side is a large bank barn with the necessary stables, sheds, etc. The property on both sides is divided by a well-kept private road with a single row of fields on either side. On the south side the water supply is from wells, and on the north side the supply for the dwelling-house and the fields adjacent is from wells, and at the rear part of this 100 acres, which is used as a permanent pasture, the supply is from a never-failing spring; 20 acres of this pasture land lying at the extreme end of the farm is comparatively new having been a few years ago a valuable bush, but a fire started on the adjoining property ran into this woodland, burning down all the timber and at the same time the proprietor on whose land the fire started lost his life at the fire. This land is all seeded down and will be allowed to remain in grass until the stumps can be taken out.

In these fields were to be seen at the time of our visit the first lot of good steers we had come across since our work of inspection for this year had begun. These steers, 11, had been bought in Toronto last fall, had been liberally fed during the winter, and were being finished off on the grass. We estimated them to weigh 1,500lb. ; they were a splendid lot of well-bred fleshy cattle, just such stock as would bring the highest price in the British markets. Looking at these cattle we found ourselves figuring on what it would be worth to Ontario if our farmers all over the country who pretended to raise cattle for beefing purposes were to raise them of this stamp, and then instead of selling them as stockers to be taken out of the country, and at the same time selling the grain off their farms to go to the same markets to fatten them, were to keep them at home and fatten them with the produce raised on their own land, and if need be supplemented with bran and oil-cake. If this were done, and care taken that they were so fattened as to ensure their selling at the highest prices in the British markets, we would hear a great deal less about worn out farms and an ever decreasing yield, and perhaps a little less business would require to be done by the farmers with the loan associations. However, as time was to us precious we left the consideration of that, as we had done other matters, to be talked over when we had more time.

The fields of grain we found to be well forward and giving indication of good cultivation. The management of the hop-yard was perfect, the soil deeply stirred and not a weed or blade of grass to be seen anywhere, and the hop-vines looked very promising. Mr. Dolmage informed us that basing his calculations on eleven years' experience it was safe to reckon on an average profit of $100 an acre.

On the south side of the road we found the soil far from being of a uniform good quality, the rock coming to the surface in many places, and over a large part of it there is such a thin covering of earth that it is practically useless for anything but pasture land. Largely owing to the difficulty of making covered drains little has been done in that way, but wherever surface drains would be of advantage they have been made; altogether 490 rods have been made.

From what has already been said it will have been gathered that Mr. Dolmage is rather an advanced stock-farmer, and as well as being a good feeder he displays intelligence in breeding No grade sires are used in the breeding stock of this farm. The stock on hand were 28 cattle, 25 sheep and 5 horses. The herd of breeding cattle was small, for the reason that three years ago a disease broke out amongst them which caused him to have to kill eight cows and all the rest were disposed of, and since that time he has been raising a good herd started from a few of the best grade heifers he could buy. Mr. Dolmage is a good farmer, making money, and at the same time, by judicious management keeping up the fertility of the soil.

Our next stopping place was to be Harrowsmith, and by the time we reached that village we had driven 29 miles. The day was warm, we had not wasted a minute from early morning, and it was now 2 o'clock. We had not even waited for dinner, and the horses fed and rested while we were working. A great part of this work had to be done to see the farm of Mr. Hunter, situated about a mile beyond the last named village, and fifteen miles from Mr Dolmage's. All we have have got to say about this farm is, that it should never have been entered for competition.

We had received letters at Newburgh from Mr. Wade, informing us that other farms had been entered, but we had in some way missed those letters containing the particulars of entry. Besides that we had now been two weeks from home, and it was a matter of no small importance to us that we should get home to attend to business requiring our personal attention. So taking the evening train for Toronto we managed to reach home the next (Sunday) morning.

On Monday, the 27th of July, work was again begun by one of us going to Woodville in the evening with the view of finishing up the inspection of Mr. Jordan's farm of the Township of Eldon the next day. The associate judge, who had not seen the farms in Renfrew, went on to that county to see the six farms entered in that county with an agreement that we would meet at Norway on Wednesday for the purpose of going over the ten farms still to be seen in the Counties of Peterboro and Hastings. Accordingly, on Tuesday, the 28th, Mr. Jordan, who had been notified of our coming, met us in the village and drove us out to his farm.

MR. J. S. JORDAN'S FARM, TOWNSHIP OF ELDON, NORTH VICTORIA.

Silver Medal.

This farm is situated three miles east of Woodville and contains 125 acres, all of which is cleared. It fronts on what is known as the Sixth Concession Road. It is divided into six fields, one of sixteen acres, of which four is taken off for yards, orchard and garden; the other five run from twenty to twenty-five acres. This matter of having large fields may be very good in theory, and strong arguments can be brought forward in favor of it, but on the ordinary sized farm, where mixed husbandry is followed out, and where soiling is not made a speciality, in our opinion it is, to say the least, very inconvenient to have so few divisions, and at Mr. Jordan's we saw an illustration of it, where he had to go to the trouble of running a temporary fence across one of these big fields just for one season's use.

From the public road to the buildings is a well kept private road, planted on either side with maples. The fences are mainly strong cedar rail, the balance being cedar log. As far as we could judge, and from what Mr. Jordan told us, nearly all the land that would be benefited by draining has been drained, these drains having been laid partly with stone and partly with tiles. The present proprietor has only occupied the farm for four years, paying for it at the time he purchased $70 an acre, but since it came into his hands a great deal has been done in remodelling the buildings, and, as they now stand, they form a very useful lot of farm buildings. The dwelling-house is a small frame, with wood-shed, etc, attached, with tidy surroundings. The main barn is 120 ft. by 40, with adjoining stables standing on solid stone foundations 30 by 75. A very good implement house stands on the west side of the barn.

This year's crops consists of 22 acres of spring wheat, barley 20 acres, oats 16, peas 11, buckwheat 4, alsike 14, and roots 7 acres, grass 31 acres. This season the fall wheat on this farm, like that on many of the farms in these central counties, had been badly winter-killed, and nearly all of it had to be plowed up and resown with spring grain. The crops generally gave indication of having been well put in, and had the appearance of being likely to give a good yield. Alsike clover is grown to a considerable extent for seed, and has been found to give good returns. At the time of our second visit this year's crop had been secured in good order.

With the exception of wheat and barley, all the other grain, as well as hay and roots, are fed on the farm, as well as the manure supply from this source. Buckwheat and clover are occasionally plowed under. A good deal of work is put upon the land in the fall previous to the last plowing, with the view of keeping down weeds and thistles, and as a result it may be termed a pretty clean farm. The stock comprised at the time we were there four horses, sixteen cattle and ten pigs. At the time of the earlier visit there was a much larger number of pigs, but when there the second time the larger ones had been sold, and only those which came in the spring were on hand. The calves are all kept in the stables during the warm weather. The stock management as a whole appeared to be very good.

It required careful consideration in balancing the strong and weak points in the management of the different competitors in this division before coming to a decision, but we finally came to the conclusion that Mr. Jordan had the strongest claim to receive the silver medal. From Norwood on Wednesday we drove first to the farm of

MR. DANIEL KELLY, TOWNSHIP OF ASPHODEL, PETERBOROUGH.

This gentleman owns a farm of 180 acres of fairly good land. Not much can be said about the farm management, and there was nothing, as far as we could see, calling for special notice.

From Mr. Kelly's we drove to the farm of Mr. English.

MR. GEORGE ENGLISH'S FARM, TOWNSHIP OF ASPHODEL, PETERBOROUGH.

Tie.—Bronze Medal.

This farm is three miles due-west from the town of Hastings—200 acres divided lengthways by the highway. The east 100 acres is a later purchase, and the buildins used at the time he bought are still standing. The dwelling-house and the main part of the homestead, however, are on the west half of the farm. These buildings are very pleasantly located, and, as well as the location being good, much has been done in enhancing the beauty of situation by the good taste displayed by Mr. English in leaving the original wood standing on the south side of the buildings and planting a large orchard on the somewhat steep hillside on the south-east. On the west side of the homestead is a small field of permanent pasture, in which is a pretty little grove. This little field, with its rich bottom of grass and fine shade and nearness to the buildings, is specially well adapted for the purpose for which it is used, and at the time we were there a nice lot o calves appeared to be enjoying life in it to the full. The fields on the east half are no all as conveniently reached as is desirable, but a private road was in course of construction, which, when completed, would make the field arrangement much more satisfactory. On this part of the farm is an excellent spring, giving a full supply of water at all seasons; the other water supply is from wells.

The cultivation of the whole farm is good, and the fields are fairly free from weeds. The buildings are roomy and useful, and well adapted to the requirements of the farm. The cattle (with the exception of a few cows) we did not see, as they were all on another farm near Rice Lake owned by Mr. English. The horses were a fine looking useful lot. The exceptionally full supply of all sorts of farm machinery and implements was a noticeable feature on this farm, as well as the care exercised in keeping them in good shape. As a great many pine stumps had to be pulled, and a great deal of heavy stone either had to be blasted or appliances obtained for lifting them, Mr. English considered it cheaper to have his own machines, so that time could be utilised to better advantage. Grain crusher, chaff cutter and all the necessary machines required on a well managed farm of that size was to be seen here.

Although not properly belonging to the report of farm management, we might mention that from the high ground on this property a magnificent view of the surrounding country is obtained—overlooking the thriving town of Hastings on the one hand and the little village of Norwood on the other. Away to the right the eye falls on the broad expanse of Rice Lake, with its terraced shores; looking in an opposite direction were to be seen the waters of the Trent, which here spread out to a considerable width, and on which were slowly floating down two immense rafts, one we were told for the great firm of Gilmours and the other for the Rathbuns of Deseronto.

A sharp drive for a few miles and we came to the farm of Mr. H. Humphries.

MR. H. HUMPHRIES' FARM, TOWNSHIP OF ASPHODEL, PETERBOROUGH.

Tie.—Bronze Medal.

This was the last farm to be seen in the County of Peterborough. It comprised 265 acres of very stony and somewhat broken land. On our way we came on Mr. Humphries in one of the outlying fields busy cradling fall wheat on newly cleared land. It perhaps might be only fancy, but we thought he dropped that cradle with a very satisfied look when we introduced ourselves and said we would like if he could spare time to show us over the farm.

This property is bounded on the north and east sides by the public road, and on the south side by the river Trent. Dividing the river from the main part of the farm is the Grand Junction branch of the G.T.R. Between the river and railway is a stretch of low-lying pasture land, which appeared to us as the most valuable part of the farm.

The fields vary very much as regards the state they are in, a number of them having been put in splendid shape, much labor having been expended on them. Comparing them with the land upon which no work has been done in the matter of clearing off the stones gives one an idea of the labor performed. Considering the work required to be done before the land was fit for cultivation, brought to our mind what has often struck us before—that is, the will-power and grit which characterises so many of the men living in the rougher sections of Ontario. Here are men to be found who have done labour, the money value of which would buy a good farm in any part of the Province, and yet have held their own; have put up good buildings, and apparently are as prosperous as the average farmer in those parts of Ontario where the local conditions are in every way more favourable. It is a question whether the comparatively small amount of hard work required to be done on the farms in the more favoured sections has not a tendency to leave undeveloped that energy and force so essential to those following the life of a farmer.

Going back to a description of this farm and its management, we found that Mr. Humphries does considerable in breeding horses, breeding along two distinct lines—Clydes and road horses—the latter showing good blood, the former not being up to the standard of the typical animals of that breed. This gentleman, like many of the farmers we have met with this season, begins to realise that he has got rather too many horses on hand at this time. In cattle he is well up, the cows being a superior lot of grade Durhams of good milking qualities. Among the young stock are two or three very nice Ayrshire heifers, with the points of good milkers well brought out. In another field were a bunch of yearlings, four of which were half-breed Holsteins. Mr. Humphries, however, prefers the Ayrshire cross, and in this we think he is right. Without particularising the systems of winter and summer (for our report is already becoming too long), we think, in this department of farm management, that he is making the best that can be made of local conditions.

The pigs, like the cattle, were good of their sort, showing unmistakably that some of the farmers in this part of Peterborough fully realised the value of keeping well bred stock. The buildings, including a well constructed and conveniently arranged two-storey brick house, are pleasantly situated, well designed and in every way a useful lot of farm buildings. Fences strong, well built and nicely kept.

In conclusion, we would say, respecting the two farms last seen, that we do not see our way clear to do anything else than recommend that each receive a bronze medal. Both Mr. English and Mr. Humphries are very strong along those lines which not only make them successful farmers themselves, but what they are doing has a tendency to cause others in their own locality to do likewise. The chief difficulty we have had in trying to discriminate between them was this—that while Mr. Humphries is unquestionably stronger as regards the thorough manner in which he has brought into cultivation some of the most difficult land to operate that we ever saw attempted to be made into tillable soil, and while we consider the management of his cattle is exceptionally good, yet when the whole farm, and what is being done on it, is taken into consideration, and the general management balanced against that of Mr. English, it was a question in our mind most difficult to settle. But, as already said, we are quite clear on this, that it is safe to set them both down as first-class farm managers, and we would like very well if the Board see its way clear to carry out our suggestion of giving each a bronze medal.

July 30.—On the arrival of the train for Ottawa, due at Norwood at noon, we boarded it, this time for Tweed. An hour and a half's run and we stepped on the platform under a pouring rain. Anxious to get on, we lost no time in getting on the road. Fortunately, shortly after starting, the weather cleared up, and the drive was in no way an unpleasant one.

MR. H. J. MOUCH'S FARM, TOWNSHIP OF HUNGERFORD, EAST HASTINGS.

The first man called on was Mr. H. J. Mouch. He had only been in possession of this property one year, and, besides the farm entered, he worked another of 200 acres. Again the oft-recurring thought passed through our minds of the mistake which many farmers make in not concentrating their efforts rather than spreading their labour over too many ill-tilled acres.

About the time we left Mr. Mouch's the weather again became very threatening, and just as we reached the next farm to be seen, owned by Mr. George Rutledge, the rain was coming down in torrents. After waiting until the storm was over, we took a look over the farm and found nothing worthy of special notice.

From here we went to Mr. Wm. Elliots, the owner of one of the farms on our list. We found this gentleman busy engaged in cutting down some very large burdocks. Here we were told that there was some mistake, as his farm had been entered without his knowledge. Fully realising that there had been a mistake made by someone, we passed on, this time to see the farm of Mr. Sidney Way.

MR. SIDNEY WAY'S FARM, TOWNSHIP OF HUNGERFORD, EAST HASTINGS.

Silver Medal.

At the first glance we saw there had been no mistake made there.

We may here remark that it has often struck us that the Secretary of the local Associations, or whoever else has the matter of farm entries in charge, does not always fully realise how much can be done in raising the reputation of a neighborhood for good farming by judiciously managing this part of the prize farm work.

This farm is situated four miles south-west of Tweed. It comprises 100 acres, all cleared with the exception of a shelter grove of second growth maples of about three acres, running for some distance along the south-west side of the farm, on a strip of land rising to a considerable height above the general level of the fields. A private road runs from the front to a pasture field of about fifteen acres at the back part of the farm. While the rest of the fields are of fine tillable soil, this pasture land is stony, with the rock cropping out at places, causing it to be only suitable for permanent pasture. A never-failing spring supplies this part of the property with an abundant water supply.

This year's crops are : Peas 8 acres, barley 6, oats 15, roots and other hoed crops 7, pasture 32, meadow 27—three acres in timber and two acres of orchard and garden making up the 100 acres. The crops we found to be away up above the average. The hay crop had been secured in fine condition, and was much more abundant than on the other farms we had visited. The crop rotation is usually to sow peas on sod, and if favorable weather for rotting during the summer, the land is prepared for wheat by plowing immediately after harvest, and well harrowed and cultivated until the 1st of September, when it is given a shallow plowing and the seed sown. After wheat comes oats or barley, seeded down with clover and timothy, the grass being left for three years. The hoed crops are followed with barley seeded down. One point Mr. Way emphasises strongly, that is, thorough preparation of the land for every crop. He is not one of those farmers who believe that successful farming can be carried on by giving one plowing in fall or spring, as the case may be, sowing seed and giving it a whisk over with the harrows and calling it done. He is evidently one of those men who is thorough in all he does. The field management was equal to anything we had seen on the best managed farms visited during our whole tour of inspection. The crops showed that evenness and general bulk, and the mown fields that smoothness of surface which is only to be seen on carefully cultivated land.

No underdraining has been done, nor yet are there any open ditches. From the nature of the soil it was evident that, with the exception of a few spots, very little trouble would arise from superabundant moisture. However, at one part of the farm a small expenditure in putting in underdrains would add to the general uniformity of a really well fixed farm.

The management of the manure is exeeedingly good, great care being exercised so that there will be as little waste as possible. After all has been used that is required for spring crops, what is left is neatly piled up and everything that is of any value in a compost heap, including what manure is made during the summer is added to this pile. It is perhaps necessary to say that on this as on all other farms where the crops were uniformly and exceptionally good, there is a very close connection between the manure pile and these heavy yields. The homestead, while comprising buildings which were fairly serviceable, would not by any means mark high ; nor yet were the fences anything more than medium.

The stock included 4 horses, 12 cows, 3 two-year-old heifers and 1 four years old, and 5 calves, with a few pigs. This is the department in which Mr. Way is ahead of all other competitors this year. The milk from this farm has been sent to the cheese factory for the last 20 years. Last year's proceeds from the 12 cows for milk sent to the factory from the 1st of May to the last of October was $436, or $36.33 per cow. What is made at home before and after sending to the factory amounted, taking an average of years, to $8 per cow ; to this also is to be added what is received for calves sold and the value of the milk given to those kept over. The calves sold (these always go to the neighbors) being from $2 to $10, say an average of $5, making an average per cow of $49.33.

Whoever has taken the trouble to look over this report will have noticed the great difference in the returns from the cows owned by this gentleman and the others which we have reported on. To us it was no matter of surprise to be told what we have here stated. The cows were a splendid lot, specially selected and bred with a view to being heavy milkers. They were a cross between grade Shorthorns and Ayrshire, with all the points of heavy milkers, well developed ; and not only were they heavy milkers, but they were also fine animals that would bring a good figure when their time for usefulness as milkers was past. It is not much to say that it would be an education for most farmers to see and carefully look over such herds, more especially if they had such men as Mr. Way to be with them to give a half hour's practical talk of how to select cows and the best way of managing them. One of your judges thinks he knew a little more about cows when he left that farm than he did when he drove up.

Getting back to Tweed in the evening, we arranged to be driven to Madoc the same night with the intention of seeing the farm of G. W. Dunn and son very early the next morning, so as to enable us to go to Foxboro by first train. Upon reaching the hotel and making enquiry as to the best way of getting out to Mr. Dunn's, we were told that Mr. Dunn, jr. was in the village. Meeting him shortly after, he told us that he had not entered his farm, and so a visit to the place was considered unnecessary.

Leaving Madoc by morning train we reached Foxboro, in good time. Considerable time, however, was lost in getting a start made. As there was no regular livery stable in this village we had to look to other ways of reaching the farms we had come to see. The storekeeper, a farmer and the carriage-maker were all interviewed before we succeeded in securing a rig.

The first farm we inspected was that of

MR. J. V. KETCHESON, TOWNSHIP OF THURLOW, EAST HASTINGS.

This gentleman owns in all 700 acres, of which only the home farm comprising 200 acres was entered. As Mr. Ketcheson was just leaving home as we arrived, to attend as a witness in a very important law suit in which his municipality was interested, we had not an opportunity of inquiring so fully into his system of farming as we would otherwise have done. It is a strong productive soil, fairly good farm buildings and an exceptionally fine and well designed house. The cultivation seemed to be passably good. Mr. Ketcheson is evidently a pushing, energetic man and has been very successful as a farmer.

From Mr. Kecheson's we drove to Mr. John Huffman's, reaching there at noon. The work of the forenoon and the long drive had sharpened our appetites, and as we drove up to the house, one of your judges, who on one or two former occasions, had displayed wonderful instinct in the same direction, took in the surroundings at a glance, and made the remark that whatever the farm was, he felt quite sure that we had struck a right place for dinner. As usual his instinct had not been at fault.

MR. JOHN HUFFMAN'S FARM, TOWNSHIP OF THURLOW, EAST HASTINGS.

This is a 100 acres of strong clay loam, well cultivated. There are a great many strong points about the management of this farm. System and order were noticeable on every hand. The buildings comprise a nicely proportioned and well constructed dwelling house, with well kept grounds. The barn and outbuildings serviceable, and quite in keeping with such a well-managed farm. The garden well supplied with all the ordinary vegetables and beautifully kept. The field arrangement, including private road, perfect in every way. This property lies lengthways on the public road, the buildings are located near the road, and from this point a private road runs back to the centre line of the farm and there connects with one running through the centre of the farm lengthways, terminating at one end where two fields open into it, and at the other where a field opens into it at one hand and the bush lot at the other. At one part of this road is a never-failing spring, and as every field opens on to this road, it will be readily seen that the water supply is exceptionally good. At the time we were there the fall wheat and barley had been cut and partly drawn in ; the yield was heavy and quality fine. The hay crop had been above an average for this year. The fields were in fine shape and tillage good.

The bush has been well attended to. From this wood is annually made a considerable quantity of syrup. An inspection of the sugar-camp showed the same close attention to details which was so noticeable in every other department of the farm management. pans and buckets carefully cleaned and laid away, and next year's snpply of wood neatly piled under cover. A small flock of sheep with a Shropshire down cross were enjoying life under a wide-spreading tree. Ten cows are kept, the milk of which is sent to the cheese factory, realising about $25 per cow. Altogether too little we think. Two or three calves are raised annually.

The weakest point we consider in Mr. Huffman's farm management is the unprofitable way in which he is handling his cattle. In the first place the cows were an inferior lot, not at all such animals as ought to be kept where the producing of milk is made a leading consideration, and further he certainly was not taking the proper course to breed better ones, for when asked what he was breeding his cows to, we were shown a mean looking specimen of a real old fashioned brindled bull of some sort of cross breeding. The cows were large enough and we thought how much better it would be to breed them to some good Ayrshire bull of the best milking strains rather than to that brindled nondescript. But after making all allowance for this weak point, Mr. Huffman ranks amongst the best class of Canadian farmers. He owns a very fine farm and tills it well. The social conditions of this pleasant farm home mark high, for as well as making farming profitable, he aims to make life enjoyable for those dependent upon him.

Leaving Mr. Huffman's we drove to the last farm to be seen, and very pleased we were to think that if all went well we would be home the next day.

MR. ALBERT JONES' FARM, TOWNSHIP OF THURLOW, EAST HASTINGS.

This a fine 200 acre farm, divided diagonally by the gravel road. We were unfortunate in not finding Mr. Jones at home, so we did the best we could without him. The field management we found to be fair. The buildings, large, well constructed and useful. The stock of cattle more numerous than on the farms generally in this part of Ontario. The herd, including fifteen cows, comprised over fifty head. The milk for about seven months is sent to factory, realising about $26 per cow received from the factory. Altogether it was a pretty fair farm and fairly well managed.

Getting through with this farm, the all important question with us was, will we catch the train for Belleville? We had quite a drive to Foxboro' and not very long to do it in. Reaching the village we found the train was behind time, and our prospects pretty fair for reaching the main line of the G.T.R. in time to connect with the night express for the west.

MR. T. C. STARK'S FARM, OF GANANOQUE, TOWNSHIP OF PITTSBURG, FRONTENAC.

Silver Medal.

This farm comprises 240 acres of which 75 acres are in grain, being barley 30 acres, oats 35, peas 10, a few acres of potatoes, 40 acres in hay, and the balance in pasture. Considerable draining has been done, altogether not less than 800 rods; these have been partly laid with tile, the largest portion however with hemlock lumber. There is nothing about the field management taking it out of the ordinary run of fairly well-managed farms. The buildings comprise a very good dwelling house built of stone, and a fair set of farm buildings being much better than many we had seen. The crops might be said to be fairly good.

The herd of cattle, consisting of forty head, belonged to a type of exceedingly good milking Shorthorns. The foundation was a Strathallan cow, bought of John Millar, Brougham, Ont. Among them were some very fine specimens, which should have been worth a good deal of money, and would have been, had it not unfortunately happened that after paying $400 for this cow, and then purchasing at different times a few good males, he at last bought one of the Roger stock, which, as many breeders of Shorthorns know, to their sorrow, would play havoc in the herd. Twenty of Mr. Starks' Strathallan females were thus rejected, entailing upon him in that way not only a great money loss, but threw him back years in the work of building up a pure bred herd. It was all the more unfortunate for the reason that if that one mistake had not been made, he would today have had probably, one of the finest herds of milking Shorthorns in Canada. But as it is there are not many animals which will register although they are a fine lot. Their milk was sent this season to the cheese factory, and had averaged per cow, up to the time we were there, 28 lb. per day. Amongst the lot are six two-year-old heifers which have averaged 25 lb. per day, one of them making as high as 35 lb. per day.

A breeding flock of 20 ewes is kept; these are a fairly good lot of Shropshires and Cotswolds. None of them are recorded, though at one time they might have been.

Mr. Stark deserves great credit for being one of the promoters in forming a society in his district for importing high-class stallions for use in that section. Those imported or purchased in other ways have been Clydesdales and Percherons. One of the latter breed having cost $2,000.

If it had not been that owing to the great number of farms entered in this year's competition causing our report to have outgrown reasonable dimensions, we might have drawn many lessons from what has come under our observation from the various features of the farms visited, and the differences in the mode of cultivation. As it is, we must allow the reader to draw these deductions himself.

We would say that in carrying out the work intrusted to us, that we laid down no cast iron rules by which we would be guided, knowing that where the soil and local conditions vary, as they do in the district wherein our work lay, that different methods suitable to the varied conditions must be followed to ensure success. It would not be reasonable to expect that the same system should be followed in Mayo and Carlow as that which has enriched the farmers in the townships around Belleville. Yet there are certain features essentially necessary in the practice of all good farmers, whether it be in the wildest part of North Hastings, or on the alluvial soils of Kent and Essex. These we have kept prominently before us in making our awards, endeavoring to make full allowance for the difficulties that had to be encountered on the varions farms and in the different sections.

Whilst making the profits of the farm a leading consideration when comparing methods, we have been careful to note whether the annual returns have been largely or otherwise at the expense of future years. We have also been careful (other things being equal) to give preference to the man who, as well as making himself rich by successful farming, was making life enjoyable for those dependent upon him, for we claim that in a farm competition the social conditions should not be ignored.

We might say before closing our report that few of those who read it can form any idea of the amount of work entailed on the judges. We may safely presume that those selected to perform it will be men who almost of a certainty, will be more or less actively engaged in farming or some kindred occupation, and to whom time at that particular season will be especially valuable.

In our own case when the time came to commence work, we found it so important in our own interests to get through as rapidly as possible, always giving due consideration to doing the work carefully, that it meant but little rest from the time we began until we finished. During the three weeks we were actually at work, over 800 miles were driven, besides travelling a great distance by rail, forty-nine farms were inspected. This, as well as taking very full notes, made it exceedingly laborious, and glad we were when the work ended.

We would take this opportunity of thanking those who by their kind hospitality made our work much pleasanter than it otherwise would have been.

John I. Hobson, Mosborough, } *Judges.*
F. W. Hodson, London, }

REPORT OF PRIZE FARM JUDGES.

The judges, Messrs. J. I. Hobson, of Mosboro', and F. W. Hodson, of London, the gentlemen appointed by the Agriculture and Arts Association to examine the farms and award the prizes in the farm competition in group No. 5, comprising the counties of Addington, Frontenac, Hastings, Peterboro', Victoria, Northumberland and Renfrew, have handed in their award.

They recommend the following prizes to be given:

Name.	P. O. Address.	Township.	County.	Prize.
James O. Huffman	Blessington	Thurlow	Hastings	Gold medal.
S. Way	Chapman	Hungerford	Hastings	Silver "
Wm. Dolmage	Newburg	Camden	Addington	Bronze "
T. C. Stark	Gananoque	Pittsburg	Frontenac	Silver "
Richard Moore	Wolfe Island	Wolfe Island	Frontenac	Bronze "
John Campbell	Havergal	Mayo and Carlow	Hastings	Bronze "
John Mackey	Boulter	Mayo and Carlow	Hastings	Bronze "
Thomas Caskey	Madoc	Madoc	Hastings	Bronze "
Wm. Westington & Sons	Plainville	Hamilton	Northumberland	Silver "
George English } Tie	Hastings	Asphodel	Peterboro'	Bronze "
Henry Humphries }	Hastings	Asphodel	Peterboro'	Bronze "
Nichol Dawson	Baillieboro'	Monoghan, S	Peterboro' West	Silver "
J. F. Davidsons	Peterboro'	Smith, Ennismore and Lakefield	Peterboro' West	Bronze "
John Airth	Renfrew	Horton	Renfrew South	Silver "
James Martin	Renfrew	Horton	Renfrew South	Bronze "
Donald Campbell	Admaston	Admaston	Renfrew South	Bronze "
Peter Cameron	....	Bexley and Carden	Victoria North	Bronze "
James S. Jordan	Woodville	Eldon	Victoria North	Silver "
John Willock	Fenelon Falls	Fenelon	Victoria North	Bronze "

Altogether there were fifty-one farms entered, entailing a great deal of work upon the judges. Over eight hundred miles had to be driven. Great interest has been taken by the farmers through the section of country where the competition lay, and it is not too much to say that this work, which is being carried on annually and in which there is a growing interest, is going to be no mean factor in raising the standard of agriculture in this Province.

The Secretary reported that Mr. Hodson had suggested that the Board might go a little further than it had gone hitherto. Farmers were sometimes backward in entering their farms for competition, and the suggestion was that the township societies might be empowered to enter three farms in the township in competition for the prizes offered.

Mr. Morgan moved, seconded by Mr. Rawlings, the adoption of the report. Carried.

PROVINCIAL PLOWING MATCHES.

The following reports respecting plowing matches were read by the Secretary:

DISTRICTS NOS. 1, 2 AND 3.

Announcement.

A plowing match under the auspices of the Agriculture and Arts Association of Ontario will take place on the farm of Captain Farlinger, adjacent to the village of Morrisburg, on Thursday, October 29th, 1891. The premiums will be divided into three classes: 1. Open to all plowmen. 2. To those who had never taken a first prize at any plowing match. 3. Boys under 18 years of age.

Rules and Regulations.

1. All entries to be made personally, or if by letter, to Ira Morgan, Metcalfe, on or before 8 o'clock a.m., on the day of the match.

2. Competitors to be on the ground at 8 a.m., and plowing to commence at 9 a.m., and to be completed at 3 p.m.

3. Each plowman shall draw his number, and the lot having a corresponding number shall be the lot on which he shall plow.

4. After drawing his number the plowman shall proceed to stake off his land, and shall be allowed one assistant to set and remove his stakes. Any plowman receiving further assistance shall forfeit his claim to any prize.

5. On proceeding to open his land each plowman shall commence at the stake corresponding with his own number, and shall back up his own furrow.

6. All plowing to be 6 x 9; a less average depth than 6 inches shall not be entitled to a prize, and not more than one inch undercut will be allowed.

7. Plowmen shall commence by a signal from the time-keeper, and shall complete their work by 3 o'clock p.m., and should there be a difference in the quantity of land a further proportionate time shall be allowed.

8. Each plowman, after finishing, must place his stake with the number on the centre of his land, and remove his team and plow from the lands immediately, and report himself to the time-keeper.

9. Should one or more competitors be considered of equal merit, the preference shall be in favor of those finishing in the shortest time.

10. The decision of the judges shall, in all cases, be final, if in accordance with the above regulations.

11. All the land plowed will be judged.

12. No person will be allowed to interfere with the plowmen while at work.

13. A copy of these regulations will be put into the hands of the judges, and will be strictly adhered to.

Report of Match.

Committee of management, D. Macpherson, Lancaster; Joshua Legge, Gananoque; Ira Morgan, Metcalfe, from Council of Agriculture; also the President and Directors of the County of Dundas Agricultural Society, and Captain Farlinger.

The entries were not as numerous as should have been expected, the contest being held in a county and section that took very little interest.

The only special prizes offered outside of the grant of the Association were by H. Ross, M.P., $5, and J. P. Whitney, M.P.P., $5, members of the council of Dundas.

The judges were William Eady, Russell; Charles Sangster, Lancaster, and William McLean, Winchester. After performing their arduous duties as judges, the following results of their decision were arrived at:

Class I.—Open to all—1st, Wm. McKendry, Osgoode, $20; 2nd, John Johnston, Dundas, $15; 3rd, George Bentley, Glengarry, $10; 4th, Alex. Pushman, Russell, $7; 5th, J. A. McClave, Osnabruck, $5.

Class II.—Open to those who never won a first prize—1st, Robt. Mitchell, Cardinal, $15; 2nd, A. C. McPhail, Vernon, $15; 3rd, Oscar C. Pitts, Osnabruck Centre, $8; 4th, Charles Weagant, Williamsburg, $6; 5th, Wm. Fetterly, Williamsburg, $4.

Class III.—Open to boys of 18 and under—1st, Wm. McDonald, Ormond, $10; 2nd, Arthur Weagant, Williamsburg, $8.

Great credit is due to Capt. Farlinger and Mrs. Farlinger for their attention given in supplying the wants of the plowmen and others throughout the day, by providing them with lunch, etc.

In the evening, the representatives of the Agriculture and Arts Association, the judges, and other friends, were entertained by Capt. Farlinger at the Windsor House, when, after the inner man had been refreshed, several toasts were proposed and responded to, the programme commencing with the usual loyal toast of "The Queen."

The Secretary of the Agriculture and Arts Association, Mr. Wade, in response to the toast of his health, expressed the pleasure of having the opportunity of being present and seeing the good work performed that day, and meeting with so many of the agriculturists of the eastern section of the province on the field throughout the day. He expressed his opinion that there should be classes for the sulky, the double mould board and other plows, as well for the Scotch plowing; and urged the starting of plowing clubs, as had been done in the west with great success.

In reply to "The health of the members of the Association," Mr. Legge responded with a few practical remarks, and referred to the great importance to the farming interest and the good work the Association had done in the past and what they hoped to do in the future.

Mr. McPherson also replied, referring to the great importance of the agricultural interests of the country, and the good these plowing matches had done in the past. The environments of the farm were altogether different from what they were in years gone by, and the tilling of the land to-day was one of the most scientific pursuits to be found in the world. The farmer had to take into consideration all the elements of animal physiology, plant food, etc., and all the requirements of life. In his concluding remarks, he congratulated both the Local and Federal Governments upon the assistance given to agriculture, and suggested the establishment of model farms in each township, so that the farmer could see the actual results, as he said, "Seeing is believing." If we wished to develop the future of our country, we must increase the fertility of the soil.

Taking all into consideration, and the distance from each member in whose district the plowing match was held, and the small amount of funds placed at their disposal to meet the prizes, and the expenses attending the same, your Committee feel that the grant, $150, given by your Association has been well and economically spent for the purpose intended.

All of which is respectfully submitted.

On behalf of the Committee,

IRA MORGAN, *Secretary.*
JOSHUA LEGGE, *Treasurer.*
D. M. MACPHERSON, *Chairman.*

DISTRICTS NOS. 4, 5, AND 6.

Report of a provincial plowing match held in Nos. 4, 5, and 6 Districts, consisting of the counties of Peterborough, Hastings, Lennox, Addington, Prince Edward, Northumberland, Victoria, Haliburton, Durham, Ontario, York, Peel, Cardwell, and the city of Toronto.

Announcement.

In connection with the Whitby and East Whitby Plowing Club, a plowing match will take place on the Hall Farm, near Brooklin, on Tuesday, October 27th, 1891. Prizes will be awarded as follows:

1st Class—Men, in Sod.

1st prize—Road cart, gift of McLachlan Carriage Co'y, Oshawa, $35; neckyoke, gift of Wm. Parks, Myrtle, $2; cash, $8—$45.

2nd prize—Sylvester gang plow, gift of T. M. Luke, Oshawa, $12 ; coal oil stove, gift of Oshawa Stove Co'y, $4 ; neckyoke, gift of Andrew Kerr, Ashburn, $2 ; whip, by Geo. Rice, Oshawa, $1.50 ; cash, $8.50—$28.

3rd prize—Goods, gift of Cedar Dale Works, Oshawa, $5 ; lamp, gift of J. S. Beaton, Oshawa, $3 ; goods, gift of F. L. Fowke, Oshawa, $1 ; whip, gift of Jas. Pellow, Oshawa, $1.75 ; goods, gift of T. G. Ryley, Oshawa, $2 ; cash, $5.25—$18.

4th prize—Set of whiffletrees, gift of Smallacombe & Wickett, Columbus, $3.50 ; neckyoke, gift of Fred. Pike, Columbus, $2 ; cash, $4.50—$10.

5th prize—Vest, gift of Richard Hugo, Columbus, $2.50 ; halter, gift of William Richardson, Columbus, $1.25 ; cash, $3.25—$7.

2nd Class—Men, in Sod.

1st prize—Chair, gift of C. Redmond, Brooklin, $2 ; halter, gift of A. C. Elliott, Brooklin, $1.50 ; 50 lb. flour, gift of John White, Brooklin, $1.35 ; goods, gift of Holliday Estate, Brooklin, $2 ; cash, $13.15—$20.

2nd prize—10 yds. dress goods, gift of E. J. B. Rowse, Oshawa, $2 ; clock, gift of Felt Bros., Oshawa, $2 ; pair pants, gift of T. Miller & Co., Oshawa, $2 ; cash $10—$16.

3rd prize—goods, gift of Mr. Symons, Oshawa, $1 ; condition powders, gift of T. J. Maxwell, Oshawa, $1.50 ; goods, gift of M. May, Oshawa, $1 ; cash, $8.50—$12.

4th prize—whip, gift of W. Rolph, Oshawa, $1 ; goods, gift of S. Trewin, Oshawa, $1 ; cash. $6—$8.

5th prize—whip. gift of L. S. Ackerman, Port Perry, $1 ; plow points, gift of J. C. Brown, Port Perry, $1 ; goods, gift of W. H. McCaw, Port Perry, $1 ; cash, $3—$6.

Stubble Class—Men.

1st prize—set of whiffletrees, gift of Welbourne & Courtice, Raglan, $3.50 ; whip, gift of Ross & Welbourne, Raglan, $1.50 ; 100 lb. flour, gift of Ross & Howden, Raglan, $2.50 ; cash, $12.50—$20.

2nd prize—hat, gift of W. G. Walters, Whitby, $2 ; goods, gift of W. R. Howse, Whitby, $1 ; whip, gift of Hatch Bros., $1 ; 2 lb. tea, gift of D. W. Macdonald, Brooklin, $1 ; 15 lb. beef, gift of T. E. Gill, Brooklin, $1.50 ; cash, $9.50—$16.

3rd prize—halter, gift of C. H. Wilson, Brooklin, $1.50 ; boots, gift of E. Carmichael, Myrtle, $2 ; lap rug, gift of S. F. Johnston, Ashburn, $1.75 ; cash, $6.75—$12.

4th prize—whip, gift of Thos. Dowson, Raglan, $1.50 ; cash, $6.50—$8.

5th prize—whip, gift of Laing & Meharry, Port Perry, $1.50 ; cash, $4.50—$6.

6th prize—whip, gift of Courtice & Jeffrey, Port Perry, $1 ; cash, $3—$4.

7th prize—cash, $2—$2

Stubble Class—Boys.—(Sixteen years and under).

1st prize—whip, gift of Everson & Hawkins, Oshawa, $1 ; cash, $12—$13.

2nd prize—Razor and case, gift of D. Cinnamon, Oshawa, $1.25 ; cash, $10—$11.25.

3rd prize—goods, gift of J. W. Fowke, Oshawa. $1 ; cash, $8—$9.

4th prize—whip, gift of W. Thompson, Whitby, $1 ; cash, $6—$7.

5th prize—goods, gift of E. J. Johnson, Whitby, $1 ; goods, gift of Ross Bros., Whitby, $1 ; cash, $4—$6.

6th prize—cash, $4.

7th prize—cash, $3.

8th prize—cash, gift of F. Lindsay, Port Perry, $2.

9th prize—cash, $1.

Specials.—Family medicine, gift of T. H. Wilson, Brooklin, for best finish in stubble class—boys, $1.50.

Cap, gift of Luke & Armstrong, Oshawa, for best finish in sod, $3.

Names of subscribers giving $2 and over in cash.—Hon. John Dryden, $5 ; Jas. I. Davidson, $5 ; Geo. Chinn, $10 ; John Little, $5 ; John Morrison, $2 ; James Stocks, Sr., $2 ; Guy & Co., $2 ; Oshawa Malleable Co., $2 ; Royal Hotel, Whitby, $2 ; M. Finnegan, $2 ; E. Hodgson, $2 ; John D. Howden, $2.

Rules and Regulations.

1st—Plows to commence precisely at 9 a.m.

2nd—First-class men in sod, entrance fee, $2.

3rd—All other classes, entrance fee $1.

4th—Parties plowing on Member's subscriptions must be sons or hired men.

5th—No prizes to be awarded unless there is competition, or at the discretion of the Judges.

6th—Furrows not to be less than 6 inches deep in sod; in stubble 8 inches in depth. Feering in stubble must be split out not less than 4 inches deep. All the ground to be plowed and judged, and every plowman to perform his work without assistance after the stakes are set, otherwise to forfeit any right he may have to a prize. No sticks or paddles allowed to be used.

7th—No handling of furrows allowed.

8th—Men who have taken a first prize with an iron plow at any previous match in Canada will not be permitted to plow in second-class men.

9th—All parties interfering with or abusing the Judges or Directors, to be expelled from the club for three years and names published.

10th—As the contract for refreshments has been let, no stands or gambling will be allowed on the grounds or highways.

11th—Time allowed for plowing to be at the rate of 16 hours per acre for sod and 12 hours per acre for stubble. Any person not finished in time will be ruled out.

12th—Sulky plows will be allowed to plow in the stubble or sod, or in both classes.

13th—Entries to be made on the grounds before nine o'clock the day of the match.

Report of Match.

Committee of Management.—J. C. Snell, Edmonton; R. Vance, Ida, and Jas. Haggerty, West Huntington; from Agriculture and Arts Association. Wm. Kerr, President, the Directors and Alex. Wilson, Secretary of the Whitby Plowing Club.

The Judges were Robert Vardon, Whitby; Arthur Barnett, Brooklin; James Rennie, Brock, in classes 1 and 2, sod; and John Vipond, Brooklin; R. R. Mowbray, Kendal; John Ross, East Whitby, and James Gibson, Mariposa, in classes 3 and 4 on stubble.

The following were the successful competitors:

Class I in sod (8 entries.)—1st, George Marquis, Brock; 2nd, Miron Martin, Reach; 3rd, Thomas Little, Sharon; 4th, David Little, Sharon; 5th, Andrew Millan, Guelph.

Class II in sod (7 entries.)—1st David Morison, Brooklin; 2nd, James McKie, Reach; 3rd, John Ruskell, Reach; 4th, Samuel Boys, Whitby; 5th, Robert Ormando, Scarborough.

Class III in stubble (14 entries.)—1st, Frank Hooper, Reach; 2nd, John Jackson, Reach; 3rd, Wm. Thompson, East Whitby; 4th, John Braming, Reach; 5th, Harvey Coate, Reach; 6th, W. I. Graham, Reach; 7th, Wm. Darcey, Cartwright.

Class IV, boys under 18 in stubble (17 entries.)—1st, E. Vardon, Whitby; 2nd, Hugh Ross, Darlington; 3rd, George Bryant, Darlington; 4th, John Clearey, Reach; 5th, Thomas Booth, East Whitby; 6th, Wm. H. Hueson, Brooklin; 7th, Alex. Durant, Brooklin.

Best finish in Class 1, sod, George Marquis, Reach.

Best finish in Class 3, stubble, Ed. Vardon, Whitby.

The day's proceedings were brought to a close by reading the names of the prize winners, and what was more pleasing, the paying of the premiums at the Brooklin Hotel to the successful competitors, after which the committee invited the judges, the plowmen and a number of friends to an excellent supper provided by mine host, George Chinn, of the Brooklin House. This was the best match ever held by the club. J. C. Snell, Edmonton; R. Vance, Ida and H. Wade, Secretary, visited the match during the day on behalf of the Agriculture and Arts Association, and expressed themselves well pleased.

Districts Nos. 7, 8, and 9.

Report of the Match.

On behalf of the Directors and members of the South Wellington Plowing Association, I hereby take this opportunity of tendering our hearty thanks to Mr. N. Awrey, M.P.P., for his careful attention to the requests of the deputation which waited upon him for the purpose of procuring the Provincial Plowing Match at the Experimental Farm, Guelph. Our thanks are also due the Agriculture and Arts Association for their generous grant of $150, and particularly to Mr. Wade, Mr. Awrey and Mr. Dawson for their presence at the match and the deep interest manifested by them throughout. About five hundred dollars were expended in prizes. The balance of the above mentioned prize list was collected by subscription through the directors and officers of the South Wellington Plowing Association. The implements were generously forwarded by the different manufacturers from various parts of the Province and were all of the most improved patterns.

Owing to the very chilly nature of the weather the attendance was very much reduced. Notwithstanding, more than 3,000 people of both sexes visited the field. Fifty-seven competitors entered and finished their lands. Mr. Fleury, of Stouffville, exhibited his Tinkler wheel plow, and Messrs. Noxon, of Ingersoll, exhibited a splendid spring tooth cultivator which they gave as 2nd prize in class for long plows.

The directors of the South Wellington Plowing Association also arranged with Messrs. Buckle and Townsend, of Guelph, to supply hot coffee and sandwiches to the visitors, and at 1.30 p.m. Mr. Mills, President of the College, kindly sent a good lunch of biscuits, cheese and hot coffee to the plowmen and their assistants.

Among those present on the field were Hon. John Dryden, Minister of Agriculture, N. Awrey, M.P.P., J. Brown, M.P., James Innis, M.P., J. D. Moore, M.P.P., H. Wade, Secretary Agriculture and Arts Association, J. R. Martin, Q.C., Cayuga; G. W. Field, Barrister, Guelph; Mr. F. Shore, *Farmers' Advocate*, London; Mr. W. Bell, Hamilton; Mr. John H. Grout, Grimsby; Mr. John Maxwell, St. Marys, Mr. Fleury, Stouffville; Mr. R. Hepburn, Port Stanley; Mr. Wm. Dawson, Vittoria; Mr. George Black, Georgetown; and George Moore, Waterloo.

The students of the College were amongst the most interested, and to them the lessons of the day must have proved most valuable. They were naturally very jubilant over the fact that J. Atkinson, of the county of Huron, one of their number, won the 1st prize in his class. He was justly considered the hero of the day by his fellow-students as well as by a large number of spectators.

When the work was finished President Mills kindly invited both the judges and plowmen to dinner in the students' dining hall, while their teams were fed and cared for in the College stables.

After supper all repaired to the city, but owing to the large crowd who anxiously waited to hear the report of the judges it was found necessary to divide, the President of the South Wellington Plowing Association taking the prize list for the long plow class to the Wellington Hotel where he read the list and paid the prizes, and the Secretary and Treasurer taking those who plowed in the jointer classes and sulky plows to the Western Hotel where the judges' report was read and prizes paid.

The following is a list of the judges' names:

For long plows and single sulkies.—George Duncan, Vittoria; George Robertson, Erin; Edward Tolton, Ospringe.

For 1st, 2nd and 4th class jointer plows.—James English, Ancaster; Andrew Richardson, Peepabun; Richard Gilmour, Strabane.

For 3rd class jointer and double sulky plows.—J. D. Moore, M.P.P., Galt; John McNab, Ayr; Alex. Yuill, Winterbourne.

Field directors for long plow class.—P. Mahon, Aberfoyle; H. Hamilton, Winterbourne; C. Cameron, Nassagaweya.

Field directors for 1st, 2nd and 4th classes.—William Milne, Morden; John Richardson, Fergus; P. Beaver, Aberfoyle.

Field directors for 3rd class sulky plows.—George Parkinson, Eramosa; James Laidlaw, Guelph; Thomas Tolton, Erin.

The most interesting feature of the whole contest was the finish in the oxen class. Mr. A. Bolton, of Eramosa, separating his team, and with one ox making a splendid finish.

The following is the prize list:

LONG PLOWS.

First Class (12 entries).

First prize—John Dickieson, Eramosa, Sellar plow, $20.
Second prize—John McQueen, Eramosa, Sellar plow, spring tooth cultivator, $35, by Noxon Bros.' Ingersoll.
Third prize—A. Milne, Guelph township, Grey plow, $15.
Fourth prize—W. Tweedle, Tweedside, Grey plow, $10.
Fifth prize—H. Cameron, Eramosa, $5.

Second Class (5 entries).

First prize—George Dix, Garafraxa, $20.
Second prize—A. Shirreffs, Winterbourne, $16.
Third prize—W. Yessop, Erin, double furrow plow, $15, by the Mowat Manufacturing Co., Whitby.
Fourth prize—J. Taylor, Jr., Rockwood, $10.
Fifth prize—H. Cameron, Eramosa, $5.

Third class (9 entries).

First prize—William Dix, Garafraxa, $20.
Second prize—E. H. Davis, Marden, a No. 21 general purpose plow, $14, also $4.
Third prize—A. Burnett, Winterbourne, $12.
Fourth prize—R. J. Elliott, Marden, $8.
Fifth prize—W. Riddock, Rockwood, $5.
Sixth prize—W. Bolton, Eramosa, $2.50.
All Tolton plows in the second and third classes.

Fourth Class (10 entries).

First prize—James Atkinson, O. A. C., Grout plow, $20.
Second prize—J. R. Watson, Guelph Township, Tolton plow, pea harvester, $14 by Tolton Bros., Guelph, also $2 by J. H. Grout, Grimsby.
Third prize—R. C. Thompson, Tolton plow, $12.
Fourth prize—F. Martin, Eramosa, Tolton plow, $8.
Fifth prize—James Armstrong, Nichol, Tolton plow, $5 by Prof. Shaw, Agricultural College, Guelph.

JOINTER PLOWS.

First Class (15 entries).

First prize—S. Hildreth, Woodburn, Wentworth, J.H. Grout plow, $20.
Second prize—John Mounce, Erin, Tolton plow, single plow, $18, by the Wilkinson Plow Co., West Toronto Junction.
Third prize—Charles Head, Eramosa, Tolton plow, choice of half dozen of fruit trees, $4, by Hooker & Grover, Rochester Nursery, N.Y.
Fourth prize—F. Mounce, Tolton plow, $10.

Fifth prize—William Sharp, Everton, $5, by B. R. McConkey, Manager Bank of Commerce, Guelph.

Specials.—Feering, box of Oriental cigars, $5, by T. J. Fair, Brantford, J. Mounce; finish spring starter, double tree, $2, by A. J. Fry, Marden, S. Hildreth; straightest plowing, silk handkerchief, $1, by E. R. Bollert & Co., Guelph, S. Hildreth.

SULKY PLOWS.

First class, single (4 entries).

First prize—J. Marshall, Grimsby, $20, John H. Grout plow.

Second prize—R. McPherson, London, McPherson plow, $12.

Third prize—George North, Marden, Tolton plow, $8.

Special for finish, box cigars, given by John Bremmer, Ennotville hotel, $1.50, R. McPherson.

Second class, double.

First prize—General purpose, $15, W. J. Ross, Aurora, Fleury plow.

SPECIAL PRIZES.

Medals—Gold medal as a sweepstakes, given by D. Martin, proprietor of the Wellington hotel, Guelph, for the best plowed land by long plow or sulky plow, John Dickieson, Eramosa.

Silver medal as a sweepstakes, given by John McAteer, Western hotel, Guelph, for the best plowed land by jointer plow, S. Hildreth, Woodburn.

Long plows.—Feering, $4 cash, by T. Holliday, Guelph, J. McQueen, Eramosa; finish, rocking chair, $2, by Stubbs & Rodger, Guelph, John Dickieson; straightest plowing, whip, $1, by John M. Bond & Co., Guelph, A. Milne.

Second class—Feering, felt hat, $2.50, by J. D. Williamson & Co., Guelph, Geo. Dix; finish, tinware, $2, by D. E. Rudd, Guelph, W. Jessop.

Third class.—Feering, dry goods, $2.50, by Shaw & Grundy, Guelph; Wm. Dix; finish, goods, $2, by E. S. Kilgour, grocer, Guelph, Alex. Burnett; straightest plowing, goods, $2, by G. D. Pringle, jeweler, Guelph, E. H. Davies.

Fourth Class.—Feering, cash, $2, by H. Garbutt, Garbutt's hotel, Guelph, J. R. Watson, Guelph township, Tolton plow; finish, neck-yoke, $2, G. Beattie, harnessmaker, Guelph, R. C. Thomson, Eramosa, Tolton plow; straightest plowing, Berlin *News* for one year, $1, by Mr. Moyer, Berlin, R. C. Thomson, Tolton plow.

Special class for oxen.—First prize—Riding bridle and martingale, $3.50, by C. Reinhardt, Commercial hotel, Guelph, and $6.50 for best plowing with oxen, A. Bolton, Eramosa, Tolton plow; 4th prize, special for the best finish with oxen, by D. McKenzie, Guelph, $2, A. Bolton.

We regret very much that the question of making a provincial plowing match was not discussed earlier in the season by our directors, as we feel confident that had it been better advertised a better match could have been got up, and we trust that the matter may receive favorable consideration from the members of the Agriculture and Arts Association to give this section a reasonable grant, and we suggest that it be held on or near the Experimental Farm, as it is central for this section and is beneficial to the class of young men attending the college.

If one were permanently established it would become better known and would bring stronger competition.

J. E. STORY,
Secretary-Treasurer.

GUELPH, December 24th, 1891.

DISTRICTS NOS. 10, 11, 12 AND 13.

The land was very dry, in fact it was too dry, but a good number came out and the match went on. The sulky plows took the attention of all, and the general remark was "that they were the plows for dry land." The weight seemed to keep them in the ground. The Essex Centre Agricultural Association paid printing, advertising and general expenses and entertained men and horses at one of the leading hotels, and are going to supplement the balance left with a good sum to have another plowing match in the county next fall when we hope the land will be in a better state to plow. There were three classes for plowmen on the bills, viz .

Champion class.—For men with long plows, open to the world.

Second class.—For men with long plows who have never taken a first prize at any open match.

Third class.—For boys under 18 years of age, with long plows.

There was also an opportunity given to manufacturers or agents to give a practical trial of sulky plows, which was taken advantage of.

The judges were Mr. A. B. Brush, Colchester; Mr. R. Preston, Leamington; and Mr. A. W. Dawson, Oldcastle. And the awards were as follows :

Champion class.—John McGarvin, Essex, 1st prize, $20; Wm. Croft, Maidstone township, Essex county, 2nd prize, $15; Wm. Nesbit, Maidstone township, Essex county, 3rd prize, $5.

Second class.—W. J. Wyatt, Maidstone township, Essex county, 1st prize, $20; Wm. Dibley, Maidstone township, Essex county, 2nd prize, $15.

Third class.—Bethel Croft, Maidstone township, Essex county, 1st prize, $15.

Sulky plows.—Agent, John Edgar; plowman, Dan Bodwin, 1st prize, $2.50. Agent, J. E. Stone; plowman, Wm. Ritchie, 2nd prize, $2.50.

The local committee were William Ellis, George Leak, William Millen, W. G. Baldwin, A. W. Cohoe, W. E. Wagstaff and A. Rawlings (member of Ontario Agriculture and Arts Association for this district).

W. D. BEAMER,
Secretary-Treasurer.

FOREST, December 5th, 1891.

Mr. RAWLINGS explained that in his district the money was not all taken up, The land was so dry that some of the prizes offered could not be competed for, consequently $45 still remained in hand. If the board allowed him to keep this $100 or $150 would be added to it by local subscription and the whole offered for prizes in a plowing match next year.

Mr. MORGAN moved, seconded by Mr. Legge, that the balance referred to be left in the hands of Mr. Rawlings on the understanding mentioned. Carried.

On motion of Mr. Simmons, seconded by Mr. Rawlings, the reports were adopted.

SWINE BREEDERS' ASSOCIATION.

The Secretary read the resolution, passed by the Swine Breeders' Association at its last meeting, in answer to the accompanying communication :

TORONTO, March 11th, 1891.

To the Officers and Members of the Swine Breeders Association.

GENTLEMEN,—I have been requested to prepare a paper on the registration of swine, and in response would say that the Agriculture and Arts Association have been recording Berkshires ever since December, 1876, and now have over 3,600 pedigrees on hand; enough to print a large volume. A Suffolk record was also started about three years ago, but as yet only 50 pedigrees have been recorded. In May, 1889, an improved York shire record was begun, and we have now over 500 pedigrees and they are increasing rapidly. I might also say of the Berkshires, that during the last two years, fully one-half of the 3,600, have been recorded, showing the demand there is at present for swine with pedigrees.

We are quite ready to commence records for Poland China, Chester White, or any good breeds of pigs; our fees are very low (50 cents each), we providing a certificate and sending blank forms for description of animals free, just one-half of what is charged for registrations in the United States. It is quite time that all swine exhibited at the larger shows should be recorded, and if all the breeds were recorded in this country, there would be no difficulty in getting the Exhibition Associations to adopt the rules.

The Agriculture and Arts Association will be pleased to enter into an agreement with your Association, whereby we can work jointly in the interests of swine breeders. I can, as secretary, in a very short time double your membership by raising our fees to non-members to $1 for each certificate instead of 50 cents, as at present. Our proposition is this, that for the registration fee of 50 cents, we will issue a certificate and print a book ready to be sold, the same as we are doing for the other Associations.

If your annual fee was large enough, you could present a volume free to each of your members, and still have some money left for other purposes. Now to get at this, in my opinion there are two ways in which to proceed, one is to increase your membership fees to $2 a year, and have a swine record printed with all the breeds in it, and give one to each member yearly. The other plan would be for the Berkshire breeders, the Yorkshire breeders and other breeders to pay an extra $1, and have the books printed separately, the other $1 being due when each volume is ready, thus having a Berkshire or other breed branch of the Swine Breeders' Association, but still acting with the Swine Breeders' Association as a whole.

In any case we intend to publish the Berkshire book this summer, and a Yorkshire one also if requested; and I now ask that a committee be appointed from these Associations to revise the pedigrees already on record, before we print them.

Hoping that one of these schemes will be adopted by your association

I remain, yours etc.,

H. Wade, Secretary.

The resolution was as follows:

"That the Dominion Hog Breeders' Association have heard with satisfaction the proposition advanced by Mr. Henry Wade, Secretary of the Agriculture and Arts Association, and resolve that the Executive meet with Mr. Wade in order to establish records, and also that the Executive act as an Editing Committee with Mr. Wade on all pedigrees. The Executive is hereby given power to add to their number if necessary, for the purpose of editing the various herd books which shall be forthwith established, Mr. Wade acting as Editor, he to notify the Executive when he desires them to meet with him The Director elected by this Association to represent any breed to be the chairman of the Editing Committee for that breed. Said Committee for each breed shall consist of the chairman elected by this body to represent such breed, together with Mr. Henry Wade, and any other interested breeder to be nominated by our Executive Committee, if demanded by the breeders of the said breed."

The Secretary explained that he had undertaken that the book should be printed and asked the necessary authority from the Board to make the expenditure required.

Mr. Simmons said that Berkshire breeders had paid hundreds of dollars to have registrations made and for his own part he did not care for the book.

Mr. Snell also said he did not care for the book, and did not believe that fifty books would be bought.

Mr. Legge thought that the Secretary should be authorised to get 400 copies of the book, on the understanding contained in the resolution.

Mr. Awrey said that the book ought not to be published until 200 members of the Swine Breeders' Association had paid for the book under the scheme proposed.

The Secretary explained that acting as he had supposed under the authority of a resolution of the Board, he had undertaken, on this resolution being passed by the Swine Breeders Association, that the book should be issued. He had understood it to be the policy of the Board to encourage these Associations and to bring them into close relations with the Agriculture and Arts Association. The book to be issued would be a series of books though under one cover. Each breed of swine would have its separate index and would be, in fact, a separate work.

Mr. Rowand moved, seconded by Mr. Legge, that the Secretary be authorised to procure not more than 400 copies of a book to cost not more than $1 a copy. The resolution was carried.

Mr. Sisson moved that the Secretary be authorised to print the Clydesdale book. The resolution was seconded by Mr. Haggerty and carried.

Mr. Awrey moved, seconded by Mr. Sisson, that an additional assistant be employed in the Secretary's office as requested in letter of the Secretary read before the finance committee. Carried.

Mr. Awrey said that the Chairman of the Committee to wait upon Hon. Mr. Carling was absent, and Mr. Gibson, who represented the Stock Breeders' Association had asked him (Mr. Awrey) to get the authority of the Board for the calling of a meeting of the Committee by the Secretary within two weeks to proceed to Ottawa.

Mr. Morgan moved, seconded by Mr. Rowand, that the Secretary be authorised to call the meeting as desired. Carried.

After discussion it was decided to call a meeting of the Horse Show Committee for Monday, 21st instant.

The Board then adjourned.

ANNUAL DINNER OF FAT STOCK CLUB.

In the evening a dinner was given in the Western Hotel by the Fat Stock Club, at which Mr. Simmons presided with the Minister of Agriculture, Hon John Dryden, at his right and Mr. James Millar, President of the Fat Stock Club on his left. At the conclusion of the dinner brief congratulatory speeches were made by the Chairman and by the Minister of Agriculture, after which those present visited the show and witnessed the judging of the animals on exhibition. It had been proposed that the speeches of the day should be made in the rink, but this place being found unsuitable, an adjournment was made to the hotel, where a very large audience assembled. Mr. Simmons was again called to the chair. In his opening remarks he said that all must agree that the show had been a most successful one and one upon which the Fat Stock Club and the Agriculture and Arts Association might well be congratulated. He spoke of the class of animals on exhibition, and noted with satisfaction the absence of the very large animals of 2,500 pounds and upwards which formerly were a feature of such shows. Feeders were now showing finely finished animals with a maximum of flesh for a small frame. This he considered a decided improvement.

PRESIDENT'S ANNUAL ADDRESS.

Mr. R. Vance, President of the Agriculture and Arts Association, was then called upon and delivered his annual address as follows:

Gentlemen,—As the President of the Agriculture and Arts Association of the Province of Ontario it is my pleasure and my privilege to extend to you a hearty greeting on this our eighth annual fat stock show, and to review briefly the work of the past year.

I believe I am justified in congratulating the farmers of our fair province upon the abundant harvest which has been gathered in during the past autumn. From every section of Ontario we hear of a large yield of every description of grainand roots, and it is gratifying indeed to learn from the Provincial Bureau of Industries that our farmers are possessed of implements, stock and buildings to the value of nearly one million dollars more than they were last year. It indicates greater prosperity and is a hopeful sign for the future.

On the day on which I was elected to preside over the deliberations of this Association, and on the day following, we held one of the most successful stallion shows in connection with the Clydesdales Association ever held in the Dominion—a show which under proper management is, I believe, destined to be second to none on this continent. I am pleased to be able to note the awakened interest in this connection, for I am convinced it is one which should be fostered and encouraged since it is a matter of great importance to the farmers of the country.

The usual prizes have been awarded for the best farms in the province in group No. 2, but as full particulars in connection therewith will be found in the printed reports, I shall not take up your time here upon that subject further than to say that I am heartily in sympathy with this practice, believing as I do that it will in time have a tendency to stimulate our agriculturists and ultimately have a beneficial effect in the improvement of farms throughout the country, and result as a consequence in higher profits than would be obtained under different conditions.

We have held a number of plowing matches at different points throughout the province this year, and I am pleased to see that they are coming more into favor and I believe doing much good.

I would strongly urge upon our farmers the necessity of starting in the line of what is called mixed farming. Much has been written on this subject, and well and forcibly written, and I desire to endorse the recommendation in this regard as strongly as in me lies. Too many cling to the old system of grain growing and selling it off and impoverishing the farm. Nor need there be any fear that the demand will not be sufficient for our stock. We have an unlimited market for all the animals we can raise, and for immense quantities of dairy produce. Indeed the market is one that can be and is being cultivated in the interest of our people, and they have only to provide the stock in order to meet with ready sales. As an indication of the profits of this trade with Great Britain, I would draw your attention to the fact that we have shipped in 1891 fully 114,000 cattle and 21,000 sheep, but I am sorry to say that too many farmers are still selling off what is known as stockers that should never leave this country until they are fully ripe for the block.

I would also call your attention to the market in England for apples, no less a number than 213,000 barrels were received at Liverpool from Canada and the United States up to November 7th, and I find that the Canadian fruit is preferred for the reason that it keeps better in transit. One man in the western part of the province has, I am informed, shipped 46,192 barrels, which means of course a large outlay of money amongst the producers, but an outlay which could and I have no doubt will be largely increased as our people realise the opportunities which lie before them in the disposal of unlimited quantities of produce. In this connection I must not omit to mention another branch of trade with English consumers, one which has but recently opened up, but which bids fair with judicious handling to assume very gratifying proportions. I allude to the shipment of turkeys. About ten days ago the farmers in the vicinity of the town of Millbrook delivered to a firm in that place 3,000 turkeys and 1,000 geese, all of which were at once shipped consigned to a firm in London, England. Some of the turkeys known as Cavan Blazers weighed as much as 25 pounds each.

The subject is one of great importance to us, and it is gratifying to know that those in authority are making an honest effort to clear away the obstacles which have hitherto lain in our path. It remains for us to take advantage of these things, and to intelligently shape our business so as to meet the new and improved opportunities which are thus presented to us.

I am pleased to see that our labors with regard to the present fat stock show have not been in vain, and I hope the members of the council and the members of the Guelph Fat Stock Club will leave this place determined that we must and shall have an annual fat stock show.

I would now call the attention of breeders and feeders to the World's Columbian Exhibition to be held in Chicago in 1893. Exhibitors and visitors will be there in large numbers, and I believe it is of the utmost importance that Ontario should make as good a showing as possible. I feel quite justified in saying that our Association will use all legitimate means to that end.

In conclusion, allow me to thank you for the kindness and courtesy which you have extended to me during the past year, while I have had the honor of presiding over your deliberations, and in returning to you the charge which you imposed upon me permit me to express the hope that the Association may long continue to exist, and that it may be the means of doing much good to the farmers of our beloved province.

HON. JOHN DRYDEN'S ADDRESS.

Hon. **John Dryden** was then called upon. In the course of his remarks he said: I do not know that we have been accustomed properly to value these fat stock exhibitions. For my own part I believe they occupy a very high place among the exhibitions held year by year. They are very valuable because of the object lessons they afford to breeders themselves. We are now engaged in producing a better class of animals and one more suited for the market. It is not enough that we should produce animals having qualities such as we think desirable, we must be guided by the demand. Our people must keep before them a high ideal, and as these shows help in that direction they are exceedingly valuable. The tendency is for older men to say: "It is well enough for so and so to produce these animals, but it is no use for me to try; it will not pay me." Our young men, however, seeing what others have done will be spurred on to attempt the same themselves. We have done a good work in this country up to this time. It is a comparatively young country. Some of our fathers who cleared the forests still live with us. They were unaccustomed to the growing of stock and devote themselves almost wholly to growing grain, but now we find that we must move in a different direction, if we would maintain and improve the fertility of our farms. We have taken a high position in this respect, but there is room for improvement still. What I would like to see is a class of good cattle scattered over the country to a far greater extent than now. My friend the President referred to the Bureau of Industries. I notice by the last bulletin that the live stock of our country is increasing considerably in value—I think something like four millions of dollars in the past year. We have 350,000 sheep in addition to what was reported last year, besides 80,000 head of cattle, but even this will not cover the entire increase in value, and if inquiry were made I think it would be found to be due to the infusion of better blood in the different portions of the country. We can increase the value of our flocks and herds largely by this means. If by the use of better sires we could improve the cattle in the country by $4 a head on the average, which would not be a large increase, it would mean an addition of $8,000,000 to the wealth of the province. It is not enough that we should produce a large quantity, we must have the quality also. I know that there are some farmers who think that it does not make any difference. My father had that view in his earlier years, and when I asked him to spend a little money in buying better animals he said it was of no use. He contended that the cattle which I so admired were better than others merely because they had been better fed and better cared for, but afterwards he was induced to spend $50 in buying a shorthorn bull calf. It turned out to be a good one. It was put in along with the other calves we were taking care of and had the same feed. Before spring it was noticed that this calf stood six inches higher than the others, and was considerably longer in the body, and as you stood behind it you saw that the animal had not only a back bone, but a back and meat down its thighs. When my father saw this he said at once that he had been mistaken, and there was a difference in the breeds, and his experience caused him to buy animals which made the foundation of the herd that I now have. I suppose there is nobody here but is already convinced that there is this difference, but there are others outside who do not believe it. We must have good animals. Nobody wants the beef produced by these scrubs. I hope to live to see the day when these scrubs will all be removed. The second thing necessary is that we should give proper care, attention and feed. I believe our best breeds would soon run out and be spoiled if they were not properly attended to and fed. Many seem to think that it does not matter how you feed a calf so long as it gets something to eat some time during the day, but that idea is going out. As one of the journals said about the stock show in Chicago recently, it was not now so much a battle of the breeders as a battle of the feeders. Some feeders will bring the animal they are caring for somewhere near the top every time. This is done simply by care and intelligent management. A third thing is necessary and that is a good market. You know the old adage that money makes the mare go, and it makes the man go too. It is a great stimulus to a man producing a beast to know that he is reasonably sure to get a good price for it. I do not mean that we want merely a good price for our beef, but we want a discriminating market. Years ago when I used to draw the grain down to the market, as I passed the buyers they would ask "what have you got?" And when I told them what it was, say barley, they would offer at once and without looking at it sixty, seventy or eighty cents according as the market was running. The result was that barley was put upon the market in many cases uncleaned, but now we know that in order to get the best price we must put the barley on the market in the best shape. Our customers do a great deal for us if they discriminate in the price they give. The English market is a discriminating market. It is not the largest animal but the best that gets the price there. I hope that we shall improve in this regard and that we may have always a discriminating market. Something has been said about the World's Fair, and many are anxious to know how Ontario is likely to come out in that great exhibition. Many of us believe that we have got the cattle here to put us in the first place if we try hard enough, and we have evidence in the exhibition here that we have the feeders who know how to manage. The next thing is what shall we do to induce our people to send the best animals there for competition. It has been suggested that the Government of Ontario should take hold of this matter. The World's Fair committee of the Association has made certain recommendations. You will not expect me to give away Government secrets, but I am prepared to say that the Government of Ontario will deal handsomely with our people in this matter. You know that when the Government of Ontario undertakes to do a thing they always do it in that way. You know also that the Government have taken a keen interest in agricultural matters. They have not always had a farmer in the Cabinet, but they have always had men willing to do what they could to further the interests of agriculture. I think we should be careful to make a fine exhibit ; it will not do to half do it. I shall be prepared to recommend to the Government and the Legislature that they should do the handsome thing in this matter, and I am sure they will do it. I want to congratulate the Agriculture and Arts Association and the Fat Stock Club of Guelph upon this exhibition Perhaps you have been at exhibitions where there have been larger numbers of cattle, but I am sure you have seldon seen better specimens. I also want to congratulate those who have been successful prize takers upon this occasion. They deserve their success. Nor should I omit to congratulate those who were beaten, because they are nearly equal to the others who have won the prizes, and I for one wish them better luck next time. I think this fat stock show ought to be continued. But I do not think it ought to be continued on meagre lines. It is not fair to ask a man to come with his beast from fifty or sixty miles east of Toronto and give him five dollars—if he is successful. I believe in the old motto—whatever is worth doing is worth doing well. Let us make this a large and successful fair if we are to hold it at all. I would suggest to the Agriculture and Arts Association that they should turn their attention in this direction. Of course I know that you cannot hold an exhibition in the best style unless you spend money. So far as I am concerned you will have my sympathy on this line. If it is necessary to have a little larger amount for this purpose I say let them have it. Those who follow agricultural pursuits believe that we have never got more than our share of these funds. We are the foundation of the prosperity of this country. If you are to have this show, locate it in the best place possible, put more money into it, conduct it on the best lines possible, and have a show which may fairly be called the Smithfield of Canada.

Mayor GOLDIE spoke of his advocacy of the erection of a permanent building in Guelph for the Provincial Fat Stock Show. He believed the citizens would back up the show, and do what was right. He believed in mixed farming. He apologised that the city hall and buildings had not been placed at their disposal owing to his absence from the city, and hoped they would meet there in future. He was in thorough sympathy with the live stock interest and hoped the Association would see their way clear to locate the permanent annual show in Guelph.

Mr. Awrey, M.P.P., spoke highly of the show, the accommodation and the place—Guelph. Here was the live stock centre, here were the most and best breeders and feeders, and his voice had always been in favor of locating the Provincial Fat Stock Show as a permanent annual institution in Guelph. He was confident the Government. on Mr. Dryden's recommendation, would help them liberally for the Chicago Fair. He believed they were on the threshold of prosperity in this Province; it was the garden of America. If they were successful in Chicago, they would wrest from the States the laurel of having the best stock in America; if they failed, breeders would go to Illinois or some other State for their choice animals. He warned Ontario breeders and feeders not to part with their best stock to Americans before 1893, or they would be beaten by their own raising. As they had done in England in cheese, so they could in butter, beef and horses. A good article would always find a market, and England would not be satisfied with anything less than the best. The show was a credit to the Province. He hoped the city would provide a building in future, and he would vote to come there every year. The Association should have granted $800 to the prize list, instead of $300.

Mr. Snell had been instrumental in getting the show at Guelph. He thought this development of fat stock was a field the Association might legitimately occupy. The show should be made permanent, and time and place should be fixed before the Association left the city. He spoke of the interest taken in this section and considered this city had a strong claim for the show. With proper encouragement and a permanent show, they could make it the best in America.

President Mills spoke strongly in favor of the importance of a fat stock show, and of the advantages that Guelph offered for its permanent location. It was the centre of the live stock district, and nowhere else would they find such a group of men prepared to stand by the show as in and around Guelph. They had the men, the enterprise, and only wanted the money. The city merchants had loyally supported the show in the past, but a larger prize list was now needed, and the Province should supply the money rather than force them to depend on attractions, as was being introduced in Chicago. The Association should, before leaving the city, make a definite proposition to the city and the club that if Guelph put up a suitable building the show should be held there permanently.

Mr. Hobson, Mr. Laidlaw, Prof. Shaw and Sheriff McKim also made capital speeches, urging the advantages of having the show permanently located at Guelph, the benefit of the show and of improved stock, the possibilities before the farmers of Ontario in English trade. The question of building a proper show place in Guelph was also urged, and the farmers' responsibilities to help therein strongly advocated. All the speeches were short and pithy.

On motion of Messrs. Snell and Awrey, a vote of thanks was passed to Mr. McAteer and his assistants, to which the latter suitably replied, intimating his willingness to help the club in every way.

Mr. Oke spoke on behalf of the exhibitors, urging a large prize list and returning thanks for his treatment here.

REPORT OF THE FAT STOCK SHOW.

The following is the report of the eighth annual Ontario Provincial Fat Stock Show held in the city of Guelph on December 9th and 10th, 1891, under the auspices of the Agriculture and Arts Association of Ontario and the Guelph Fat Stock Club.

Committee of Management—From the Agriculture and Arts Association of Ontario: Messrs. J. C. Snell, Edmonton; R. Vance, Ida; N. Awrey, M.L.A., Binbrook; C. M. Simmons, Ivan; J. Legge, Gananoque; A. Rawlings, Forest. Directors from Fat Stock Club of Guelph: Mayor Goldie, Guelph; Walter West, Guelph; J. M. Tyson, Guelph; Prof. T. W. Shaw, O.A.C., Guelph; James Taylor, Mosborough; James Anderson, Guelph; William McCrea, Guelph; J. E, Story, O.A.C., Guelph; H. Wright, Guelph; L. O, Barber, Guelph; W. R. Elliott, Guelph; Alf. Hales, Guelph: Walter Laing, Eden Mills; Ald. Barber, Guelph; G. Whitelaw, Guelph; Ald. Hewer, Guelph; President Mills, O.A.C., Guelph; W. Laidlaw, Guelph; R. Buchanan, Gourock; Robt. Irving, Nassagaweya; George Taylor, Rockwood; Thos. Waters, Rockwood; James Miller, Guelph; W. Young, Guelph; Ald. Reed, Guelph.

PRESIDENT—C. M. Simmons, Ivan.

1ST VICE-PRESIDENT—James Miller, Guelph.

TREASURER—John McCorkindale, Guelph

SECRETARY—Henry Wade, Toronto.

GENERAL SUPERINTENDENT—H. Wright, Guelph.

COMMITTEE ON CATTLE.—N. Awrey, A. Rawlings, L. O. Barber, G. Whitelaw, W. West, Prof. Shaw, O.A.C.

COMMITTEE ON SHEEP.—J. C. Snell, T. Waters, President Mills, O.A.C., A. Hales, W. R. Elliott, R. Buchanan.

COMMIMTEE ON HOGS.—James Taylor, W. McCrea, G. Taylor, R. Irving.

COMMITTEE ON POULTRY.—James Anderson, W. Laing.

CATTLE.

JUDGES.—Thomas Allison, Galt; J. Groff, Elmira; Ald. W. Crealock, Toronto.

CLASS I.—THOROUGHBRED CATTLE OF ANY BREED.

SEC. 1.—*Steer, 1 and under 3 years.*

Four entries.—1st prize, $10.00. 2nd prize, $7.00. 3rd prize, $4.00.

1st premium to Thos. Ballantyne & Son, Stratford, "White Duke." S.H.
2nd " Jas. Oke & Sons, Alvinston, "White Prince." S.H.
3rd " A. A. Armstrong, Fergus, "Redmond."

SEC. 2.—*Cow or Heifer, 3 years and over.*

Six entries.—1st prize, $10. 2nd prize, $7. 3rd prize, $4.

1st premium to Weir & Weir. St. Marys, "Butterfly's Gem."—14637
2nd " John Currie & Son, Everton, "Everton Snowball." S.H.
3rd " Peter Stewart, Everton.

CLASS II.—GRADES OR CROSSES OF ANY BREED.

SEC. 1.—*Steer and Heifer, 3 and under 4 years.*

Three entries.—1st prize, $10. 2nd prize, $7. 3rd prize, $4.

1st premium to Weir & Weir, St. Marys, "Grey Fan."
2nd " " " "Red Flo."
3rd " Jas. Oke & Sons, Alvinston, "Davie."

SEC. 2.—*Steer, 2 and under 3 years.*

Two entries.—1st prize, $10. 2nd prize, $7. 3rd prize, $4.

1st premium to Jas. Oke & Sons, Alvinston, "Dainty."
2nd " Thos. Ballantyne & Son, Stratford, "Sandy."

SEC. 3.—*Steer, 1 and under 2 years.*

Three entries.—1st prize, $10. 2nd prize, $7. 3rd prize, $4.

1st premium to S. Loree, Rockwood, "Red Duke."
2nd " L. O. Barber, Guelph, "Tommy."
3rd " D. Robertson, Ospringe.

SEC. 4.—*Cow or Heifer, 3 years and over.*

Two entries.—1st prize, $10. 2nd prize, $7. 3rd prize, $4.

1st premium to W. C. Short, Salem, "Ella."
2nd " Wm. Rae, Arkell.

SEC. 5.—*Heifer, 2 and under 3 years.*

Three entries.—1st prize, $10. 2nd prize, $7. 3rd prize, $4.

1st premium to Jas. Oke & Sons, Alvinston, "Daisy."
2nd " Thos. Ballantyne & Sons, Stratford, "Miss Downie."
3rd " Peter Stewart, Everton.

SEC. 5½.—*Heifer, 1 and under 2 years.*

Two entries.—1st prize, $10. 2nd prize, $7. 3rd prize, $4.

1st premium to D. Robertson, Ospringe.
2nd " D. McCrae, Guelph' "Black Beauty."

SEC. 6.—*Calf, Steer or Heifer, under 1 year.*

Five entries.—1st prize, $6. 2nd prize, $4. 3rd prize, $2.

1st premium to A. A. Armstrong, Fergus, "William R."
2nd " " " "Pilot."
3rd " Wm. Spencer, Guelph, "Daisy."

CLASS III.—SWEEPSTAKES FOR CATTLE.

SEC. 1.—*Best Steer any Age or Breed.*

Premium to James Oke & Sons, Alvinston, "White Prince."

SEC. 2.—*Best female, any age or breed.*

Premium to James Oke & Sons, Alvinston, "Dainty."

SHEEP.

JUDGES.—John Brown, jr., Galt; G. H. Waller, Toronto; Wm. Walker, Ilderton.

CLASS IV.—LONG WOOLED, LINCOLNS, LEICESTERS, COTSWOLDS, AND THEIR CROSSES.

SEC. 1.—*Wether, 2 and under 3 years.*

Four entries.—1st prize, $6. 2nd prize, $4. 3rd prize $2.

1st premium to John Rutherford, Roseville, "Top."
2nd " to Robert Irving & Sons, Nassagaweya, "Jim."
3rd " to John Rutherford, Roseville, "Grant."

SEC. 2.—*Wether, 1 and under 2 years.*

Three entries.—1st prize, $6. 2nd prize, $4. 3rd prize, $2.

1st premium to John Rutherford, Roseville, "Dandy."
2nd " to Robert Irving & Son, Nassagaweya, "Tom."
3rd " to John Kelly, Jr., Shakespeare, "Tom."

SEC. 3.—*Wether, under 1 year.*

Five entries.—1st prize, $6. 2nd prize, $4. 3rd prize, $2.

1st premium to Joseph Kirby, Armstrong's Mills, "Bobble."
2nd " to John Kelly, jr., Shakespeare, "Bob."
3rd " to John Pringle, Mosborough, "Joe."

SEC. 4.—*Ewe, 2 years and over.*

Six entries.—1st prize, $6. 2nd prize, $4. 3rd prize, $2.

1st premium to John Kelly, jr., Shakespeare, "Meg."
2nd " to William Oliver, Avonbank, "Beauty."
3rd " to " " "Curly."

SEC. 5.—*Ewe, 1 and under 2 years.*

Two entries.—1st prize, $6. 2nd prize, $4. 3rd prize, $2.

1st premium to John Kelly, Jr., Shakespeare, "Jenny."
2nd " to William Oliver, Avonbank, "Bessie."

Sec. 6.—*Ewe, under 1 year.*

Seven entries.—1st prize, $6. 2nd prize, $4. 3rd prize, $2.

1st premium to John Kelly, jr., Shakespeare, "Annie N."
2nd " to " " "Queenie."
3rd " to " " "Ida."

CLASS V.—Middle Wooled, Downs and their cross.

Sec. 1.—*Wether, 2 and under 3 years.*

Three entries.—1st prize, $6. 2nd prize, $4. 3rd prize, $2.

1st premium to John Rutherford, Roseville, "Jock."
2nd " to " " "Patrick."
3rd " to " " "Dick."

Sec. 2.—*Wether, 1 and under 2 years.*

Four entries.—1st prize, $6. 2nd prize, $4. 3rd prize, $2.

1st premium to John Rutherford, Roseville, "Jonas 1st."
2nd " to " " "Jonas 2nd."
3rd " to John Kelly, jr., Shakespeare, "Adam."

Sec. 3.—*Wether, under 1 year.*

Two entries.—1st prize, $6. 2nd prize, $4. 3rd prize, $2.

1st premium to Robert Douglas, Aberfoyle, "Cully."
2nd " to " " "Allie."

Sec. 4—*Ewe, 2 years and over.*

No entries.—1st prize, $6. 2nd prize, $4. 3rd prize, $2.

Sec. 5—*Ewe, 1 and under 2 years.*

No entries.—1st prize, $6. 2nd prize, $4. 3rd prize, $2.

Sec. 6.—*Ewe, under 1 year.*

Three entries.—1st prize, $6. 2nd prize, $4. 3rd prize, $2.

1st premium to H. Wright. Guelph, "Sue."
2nd " " " "Sall."
3rd " " " "Sis."

CLASS VI.—Sweepstakes for Sheep.

Sec. 1—*Pen of Sheep, 4 in number, any age or breed, Ewes or Wether.*

Three entries.—Prize—Root pulper, given by the Gowdy Mfg. Co., Guelph.

Premium to John Rutherford, Roseville.

Sec. 2—*Pen of four Lambs, any breed, Ewes or Wethers.*

Six entries.—Prize—Root pulper, given by the Fleury Mfg. Co., Aurora.

Premium to Joseph Kirby, Armstrong's Mills.

HOGS.

Judges—J. A. Hardy, Guelph; Geo. Clayton, Guelph; Arthur Farr, Guelph.

CLASS VII.—Hogs, any Breed.

Sec. 1.—*Barrow, 1 and under 2 years.*

No entries.—1st prize, $6. 2nd prize, $4. 3rd prize, $2.

Sec. 2.—*Barrow under 1 year.*

Four entries,—1st prize, $6. 2nd prize, $4. 3rd prize, $2.

1st premium to Thos. Bolter, Mosborough, "Alex."
2nd " Geo. Fyfe, Gourock, "Dick."
3rd " G. S. Armstrong, Fergus, "Jock."

Sec. 3.—*Sow, 1 and under 2 years.*

Two entries.—1st prize, $6. 2nd prize, $4. 3rd prize, $2.

1st premium to J. & R. Miller, Guelph, "Ella."
2nd " " " "Jessie."

Sec. 4.—*Sow, under 1 year.*

Six entries.—1st prize, $6. 2nd prize, $4. 3rd prize, $2.

1st premium to Thos. Bolter, Mosborough, "Jane."
2nd " D. Barberrie, Corwhin, "Marion."
3rd " G. S. Armstrong, Fergus, "Bess."

CLASS VIII.—Sweepstakes for Hogs.

Pen of fat Hogs, four in number.

One entry.—Prize, goods to the amount of $7 given by Jas. Hewer, Guelph.

Premium to Geo. Fyfe, Gourock.

POULTRY.

Judges—G. Murton, Guelph; Thos. Watts, Guelph; Geo. Tolton, Guelph.

CLASS IX.—Poultry.

Sec. 1.—*Pair Dressed Turkey Cockerels.*

Three entries.—1st prize, $2; 2nd prize, goods (P. Anderson, Guelph), 3rd prize, $1

1st premium to Jos. Tomalin, Brampton.
2nd " Robt. Buchanan, Guelph.
3rd " Geo. Fyfe, Gourock.

Sec. 2.—*Pair Dressed Turkey Pullets.*

Four entries.—1st prize, $2. 2nd prize, $1.50. 3rd prize, $1.

1st premium to Jos. Tomalin, Brampton.
2nd " Willie Tomalin "
3rd " Geo. Fyfe, Gourock.

Sec. 3.—*Pair Dressed Ganders.*

Three entries.—1st prize, $2; 2nd prize, goods (J. E. McElderry, Guelph), 3rd prize, $1.

1st premium to Robt. Buchanan, Guelph.
2nd " Jos. Tomalin, Brampton.
3rd " Geo. Fyfe, Gourock.

Sec. 4.—*Pair Dressed Geese.*

Five entries.—1st prize, $2. 2nd prize, $1.50. 3rd prize, $1.

1st premium to Robert Buchanan, Guelph.
2nd " Jas. Anderson "
3rd " Jos. Tomalin. Brampton.

SEC. 5.—*Pair Dressed Drakes.*

Seven entries.—1st prize, $2. 2nd prize, $1.50. 3rd prize, $1.

1st premium to Alf. Hales, Guelph.
2nd “ Mrs. G. Murton, Guelph.
3rd “ Robt. Buchanan “

SEC. 6.—*Pair Dressed Ducks.*

Four entries.—1st prize, $2. 2nd prize, $1.50. 3rd prize, $1.

1st premium to Alf. Hales, Guelph.
2nd “ Jos. Tomalin, Brampton.
3rd “ Geo. Fyfe, Gourock.

SEC. 7.—*Pair Dressed Cockerels.*

Two entries.—1st prize, $2. 2nd prize, $1.50. 3rd prize, $1.

1st premium to Geo. Fyfe, Gourock.
2nd “ Jos. Tomalin, Brampton.

SEC. 8.—*Pair Dressed Pullets.*

Two entries.—1st prize, $2. 2nd prize, $1.50. 3rd prize, $1.

1st premium to Jos. Tomalin, Brampton.
2nd “ Geo. Fyfe, Gourock.

SEC. 9.—*Dressed Turkey Cock, any age.*

Three entries.—1st prize, goods (Kelcher & Hendley) $3; 2nd prize, goods (E. H. Kilgour) $2.

1st premium to Jas. Anderson, Guelph.
2nd “ Robt. Buchanan. “

SEC. 10.—*Display Dressed Poultry, hatched in 1891.*

Two entries.—1st prize, goods (J. W. Lyon), $4.50; 2nd prize, goods (G. D. Pringle), $3; 3rd prize, goods (W. A. Clark), $2.

1st premium to Geo. Fyfe, Gourock.
2nd “ Jos. Tomalin, Brampton.

CLASS X.—HEAVIEST TURKEY.

One entry.—1st prize goods (G. Williams, Guelph), $2.

Premium to John Rutherford, Roseville.

FINANCIAL STATEMENT.

Jno. McCorkindale in account with the Agriculture and Arts Association *re* Provincial Fat Stock Show, 1891.

Receipts.		*Expenditure.*	
Cash, Agriculture and Arts Association	$300 00	Paid prizes	$349 00
“ Guelph Fat Stock Club	156 75	Donations and goods	126 00
“ entry fees	120 50	Printing and advertising	63 90
“ gate receipts	68 75	Expenses, rent, gas, ribbons and work preparing skating rink	125 30
Medal, Jno. McAteer	35 00	Balance paid Guelph Fat Stock Club	107 80
Silver Service, *Farmers' Advocate*	35 00		
Goods	56 00		
	$772 00		$772 00

PRIZE AWARDS FOR HORSES AND CATTLE AT EXHIBITIONS HELD AT TORONTO, LONDON AND OTTAWA.

THOROUGHBRED HORSES.

STALLIONS 4 YEARS OLD AND UPWARDS.

Toronto :

1st, Jos. E. Seagram, Waterloo, "Buffalo ;" sire, Billet (imp.); dam, Belle Palmer.
2nd, John Dyment, Orkney, "King Bob ;" bay, foaled in 1883; bred by Chinn & Morgan, Kentucky, U. S.; sire, King Ban ; dam, Bobadilla, by Bonnie Scotland (imp.), etc.
3rd, Mowat & Maclean, Toronto, "Disturbance ;" sire, Terror ; dam, Bobadilla.

London :

1st, J. B. Martyn, Masonville, "Ranelagh II." (vol. 15, page 308, English S. B.); sire, Cremorne; dam, Miss Evelyn, by Orlando, etc.
2nd, S. B. Fuller, Woodstock.

Ottawa :

1st, Robert Thompson, Ottawa.

STALLION 3 YEARS OLD.

Toronto :

1st, John Dyment, Orkney, "Gladstone ;" sire, Terror ; dam, Nettie.

London :

1st, T. D. Hodgins, London.
2nd, John Dyment, Orkney, "Gladstone ;" see above, Toronto.

STALLION, 2 YEARS OLD.

Toronto :

1st, Thos. Meagher, Todmorden, "Gamble Orr (imp.) (293) ; bay, one hind foot white ; foaled in 1889 ; bred by Gamble Orr, Ormonde College Stud, Sydenham, Belfast, Ireland ; imported Sept., 1890, by breeder ; sire, My Lud ; dam, Bee Bird, by Buccaneer, etc.
2nd. John Dyment, Orkney, "King John ;" bay, foaled in 1889 ; bred by exhibitor ; sire, King Bob ; dam, Lucy Lightfoot, by Big Sandy, etc.
3rd, John Dyment, Orkney, "Bob King ;" sire, King Bob ; dam, Rosabella.

London :

1st, Jas. Brady, Glanworth.
2nd, John Dyment, Orkney, "King John ;" see above, Toronto.

Ottawa :

1st, Jacob Erratt, Ottawa.
2nd, And. Lacelle, Ottawa.

YEARLING COLT, ENTIRE.

Toronto :

1st. Jos. Duggan, Toronto, "Foam ;" sire, Ocean Wave ; dam, Toomony.
2nd, John Dyment, Orkney, "King Joe ;" sire, King Bob ; dam, Lucy Lightfoot, by Big Sandy etc.

London :

1st, John Dyment, Orkney, "King Joe ;" see above, Toronto.
2nd, N. Sage, London, "Ban Daly ;" chestnut, foaled in 1890 ; sire, Glen Daly ; dam, Mary Williams, by Barney Williams, etc.

STALLION, ANY AGE.

Toronto :

Thos. Meagher. Todmorden, "Gamble Orr ;" (imp.) (263) ; see above.

London :

J. B. Martyn, Masonville, "Ranelagh II. ;" see above.

Ottawa :

Robt. Thompson, Ottawa.

MARE OR GELDING, 4 YEARS OLD AND UPWARDS.

Toronto :

1st, John Dyment, Orkney, "Blackbird ;" sire, Big Sandie ; dam, Nettie.
2nd, John Dyment, Orkney, "Flip Flap ;" sire, Blankiron ; dam, Nettie.
3rd, John Dyment, Orkney, "Aunt Alice ;" sire, Terror ; dam, Ada.

THREE-YEAR OLD FILLY.

Toronto :

1st, Geo. Kennedy, Brampton, "Addie B. ;" sire, Voltigeur ; dam, Pet.
2nd, John Dyment, Orkney, "Annie D. ;" sire, Terror ; dam, Rosabelle.
3rd, John Dyment, Orkney, "Arrow ;" sire, Van Horne ; dam, Aunt Alice.

London :

1st, John Dyment, Orkney, "Volga ;" sire, Francis L. ; dam, Olga, by Collossus, etc.
2nd, John Dyment, Orkney, "Annie D. ;" see above, Toronto.

TWO-YEAR OLD FILLY.

Toronto :

1st, John Dyment, Orkney, "Queen Mary ;" sire, King Bob ; dam, Nettie.
2nd, John Dyment, Orkney, "Fanny Kirk ;" sire, King Bob ; dam, Maggie May.

London :

1st, T. D. Hodgins, London.
2nd, John Dyment, Orkney, "Fanny Kirk ;" see above, Toronto.

YEARLING FILLY OR GELDING.

Toronto :

1st, Thorncliffe Stock Farm, Todmorden. "Bee Queen ;" sire, Strathspey ; dam, Bee Hive.
2nd, Jos. Duggan, Toronto, "Noisy ;" sire, Commotion ; dam, Quarrel (imp.)
3rd, John Dyment, Orkney, "Edith C. ;" sire, King Bob ; dam, Jessamine Porter.

London :

1st, Thorncliffe Stock Farm, Todmorden. "Bee Queen ;" see above Toronto.
2nd, T. D. Hodgins, London.

Ottawa :

1st, Thorncliffe Stock Farm, Todmorden, "Bee Queen ;" see above, Toronto.

BROOD MARE WITH FOAL BY HER SIDE.

Toronto :

1st, Jos. Duggan, Toronto, "Algeria" (imp.) Aronagnac ; dam, Zouave.
2nd, John Dyment, Orkney, "Lucy Lightfoot ;" sire, Big Sandy ; dam, Nettie.
3rd, John Dyment, Orkney, "Maggie May ;" sire, Big Sandy ; dam, Nettie.

London :

1st, T. D. Hodgins, London.
2nd, N. Sage, London, "Mary Williams ;" bay, foaled in 1877 ; sire, Barney Williams ; dam, Lady of the Lake, by Mammon, etc.

Ottawa :

1st, Sir A. P. Caron, Ottawa, "Disappointment ;" sire, Milesian ; dam, Betsy Washington, by Sepington, etc.

FOAL OF 1891.

Ottawa :

1st, Slattery Bros., Ottawa.

London :

1st, Jas. Brady, Glanworth.
2nd, T. D. Hodgins, London.

MARE, ANY AGE.

Toronto :

Jos. Duggan, Toronto, "Algeria," (imp.)

London :

T. D. Hodgins, London.

Ottawa :

Sir A. P. Caron, Ottawa, "Disappointment ;" sire, Milesian ; dam, Betsy Washington.

SPECIAL PRIZES FOR THOROUGHBREDS—BEST STALLION 4 YEARS OLD AND UPWARDS WITH FIVE OF HIS PROGENY OF ANY AGE OR SEX.

Toronto:

1st, John Dyment, Orkney, "King Bob."
2nd, Mowat & McLean, Toronto, "Disturbance."

STALLION WITH THREE OF HIS GET, ANY AGE OR SEX.

Ottawa:

Robt. Thompson, Ottawa.

ROADSTER HORSES.

STALLION 4 YEARS OLD AND UPWARDS—NOT LESS THAN 15½ HANDS HIGH.

Toronto:

1st, J. Craig, V.S., Hamilton, "Frank Ellis;" sire, Happy Medium; dam, Dutch Girl.
2nd, Oakdale Stock Farm, Pickering, "Forest Mambrino," 9865; sire, Mambrino Patching.
3rd, John M. Whitlaw, Paris, "Tristam" 5583; sire, Axmoor; dam, Eliza.

London, (in harness):

1st, Randall Learn, Aylmer, "Gold Ring" 12899, chestnut, stripe on face, little white on off hind foot, foaled in 1884; sire, Eden Golddust; dam, Nellie Ingersoll by Fearnaught Gift, etc.
2nd, D. Ferguson, London.
3rd, O. A. Coates, Bothwell, "J. I. Case," 7511; bay, little white on face, bred by J. I. Case, Racine, Wis.; sire, Phallas 1446; dam, Mila C., by Blue Bell, 75, etc.

STALLION, 3 YEARS OLD.

Toronto:

1st, W. P. McClure, Woodstock, "St. Jerome;" sire, Buffalo Bill; dam, Miss Clear Grit.
2nd, Wm. P. Kerr, Mitchell, "Gritwood" 15998; sire, Thornwood 1567; dam, Annie C.
3rd, John A. Dale, Palermo, "Phil Sheridan;" sire, Phil Sheridan, Jr.; dam by Black Hawk.

London:

1st, Thos. Hey, Ailsa Craig, "Four Lines," 11269; bay, foaled July 13th, 1888, bred by exhibitor; sire, Western Sprogue 2289; dam, Egotism, by Princeps, 536 etc.
2nd, John Dawson, Tempo.

STALLION, 2 YEARS OLD.

Toronto:

1st, Thos. Lapslie, Seaforth, "Calvin;" sire, Carlisle; dam by Old Clear Grit.
2nd, Wesley Cline, Binbrook, "———;" sire, Frank Ellis; dam by Highland Boy.
3rd, Sharp & Dalton, Delhi, "Shadeland Duval," 13755.

YEARLING COLT, ENTIRE.

Toronto:

1st, Irving & Brown, Winchester, "Fashion;" sire, Brilliant, 1434.
2nd, John Bunyan, Thorold, "Brave Napoleon,' 488; sire, Jas. Macklem, 489; dam, Ætna, 1434.
3rd, Elias Holder, Welland.

London:

1st, James, Page, Ridgetown.
2nd, James McDonald, London.
3rd, O. A. Coates, Bothwell, "Clear Case;" brown, foaled June, 1890; sire, J. I. Case, 7511; dam, by Clear Grit, 859 etc.

STALLION, ANY AGE.

Toronto:

J. Craig, V. S., Hamilton, "Frank Ellis."

London:

Jas. Page, Ridgetown.

THREE YEAR OLD GELDING.

Toronto:

1st, Richard Goodison, Cooksville, "———— ;" sire, Bellmount; dam, by Whalebone.
2nd, J. F. & A. R. Vansicle, Jerseyville, "Willie Scott;" sire, Harry Scott; dam by Royal George.
3rd, J. F. & A. R. Vansicie, Jerseyville, "Harry Scott;" sire, Harry Scott; dam by Royal George.

THREE YEAR OLD FILLY OR GELDING.

London:

1st, D. Ferguson & Bro., London
2nd, E. McClurg, Ivan.
3rd, R. Heuston, Birr.

Ottawa:

1st, George Roe, Ottawa, "———— ;" foaled July, 1887; bred by Thos. Kennedy, Ottawa; sire, Neighbor; dam, Rose Lawrie by Whip Clay. etc.
2nd, E. J. Rainboth, Ottawa.
3rd, A. Anderson, Ottawa.

THREE YEAR OLD FILLY.

Toronto:

1st, Lewis Waterhouse, Cooksville, "Bell;" sire, Bellmount; dam, by War Cry.
2nd, Alex. Davidson, Seaforth, "Clemmie D.;" sire, Goderich Chief; dam, Maggie Mitchell.
3rd, A. J. Hamilton, Stratford, "Jennie Wilkes;" sire, Dillard Wilkes; dam by Clear Grit.

TWO YEAR OLD GELDING.

Toronto:

1st, Jas. M. Bussel, Hornby, "Mark;" sire, Marcus; dam, Lady Mac.
2nd, Simeon P. Wymer, Wilsonville, "Ben B.;" sire, Benedict, 3442; dam by Toronto Chief.
3rd, Dr. D. A. Nellis, Thornhill.

TWO YEAR OLD FILLY OR GELDING.

London:

1st, R. McLean, Lucan, "Lucy," foaled in 1889, bay; sire, Montezuma; dam, Maud Mac by Old Clear Grit, etc.
2nd, H. Scott, Caledonia.
3rd, T. D. Hodgins, London.

TWO YEAR OLD FILLY.

Toronto:

1st, Teeter & Wardell, Smithville, "Maud Belle;" sire, Monogram; dam by Tom Kemble.
2nd, Wm. Smith, Seaforth, "Polly Bell;" sire, Jamey Bell; dam, Polly Ess.
3rd, Robt. Wilson, Seaforth, "Emma:" sire, Ned Forest.

YEARLING FILLY OR GELDING.

Toronto:

1st, Jacob Moore, Norwich.
2nd, Wesley Cline, "Binbrook"; sire, Frank Ellis; dam, by Highland Boy
3rd, Thomas Aikins, Mount Charles, "Katie Carroll"; sire Forrest Mambrino; dam, Ontario Maid.

London:

1st, D. A. Thorpe, Delhi.
2nd, W. C. Short, Salem, "Stella'; sire, Zena; dam, Polly by Jack the Barber, etc.
3rd, W. H. Millman, Woodstock, "————"; sire, Dandie Dinmont.

BROOD MARE WITH FOAL OF SAME BREED BY HER SIDE NOT LESS THAN 15½ HANDS.

Toronto:

1st, John Clark, Alloa, "Polly C."; sire, Brown Douglas; dam by old Hackaway.
2nd, R. M. Wilson, Delhi, "Alice K."; sire, Lawell; dam, Dolly, by Enchanter, etc.
3rd. A. R. Johnson & Co,, Hanlan, "Laurie Smith"; sire, Boston, : dam, by Royal George.

London:

1st, R. M. Wilson, Delhi, "Alice K", (see above, Toronto.)
2nd, D. H. McPherson, Glanworth.
3rd, W. Langford, Maple Grove, "Mollie B."; sire, Middlesex; dam, mare by Albion, etc.

FOAL OF 1891.

Toronto :

1st, Robert Wilson, Brampton, "Mambrino Wilkes"; sire, Forest Mambrimo; dam, Vickey Wilkes.
2nd, A. R. Johnston & Co., "Hanlan"; sire, Honest Wilkes; dam. Laurie Smith.
3rd, W. H. Millman, Woodstock, " ——— "; dam Rosa.

London :

1st, D. H. McPherson, Glanworth.
2nd, Benjamin Marlatt, New Sarum.
3rd, D. Stewart, Ivan, "Chester"; bright bay, star on face, hind feet white, foaled in 1884. Bred by E.W. & G. Charlton Duncrief; sire, Ridgewood (10,358); dam, the Hoe mare by Wilson's Sir Henry etc.

PAIR OF MATCHED HORSES (GELDINGS OR MARES) IN HARNESS UNDER 16 HANDS AND OVER 15½ HANDS.

Toronto :

1st, Horace F. Widner, Simcoe.
2nd, Fred Kerr, Columbus, "George"; sire, General Keene; dam, Poll.
"Jess"; sire, General Keene; dam, Poll.
3rd, Fred Thompson, Woodstock, "Fred"; sire, Old Whistle Jacket; dam, by Clear Grit.
"Sam," sire, Old Whistle Jacket; dam, by Clear Grit.

London :

1st, G. A. Rutledge, Lambeth.
2nd T. Hortop, St. Thomas.
3rd, C. P. Geary, St. Thomas, "Nellie Hunter," black, foaled 1886; sire, Bob Hunter.
"Texas Joe," black, foaled 1887; sire, Texas Jack.

PAIR OF MARES OR GELDINGS, 3 YEARS AND OVER.

Ottawa :

1st, M. Beauvois, Ottawa.
2nd, Rufus Lane, Prescott.
3rd, Geo Parlow, Iroquois.

PAIR MATCHED HORSES (GELDINGS OR MARES) IN HARNESS, 15½ HANDS AND UNDER.

Toronto :

1st, John Clark, Brampton, "Stella and Nettie."
2nd, Elam McIntyre, Brantford, "Maud"; sire, Old Clear Grit; dam by Royal George.
"Dominion"; sire, Tip Top; dam, by Toronto Chief.
3rd, T. H. Speight, Markham, "Nellie"; sire, Gold Dust; dam, French mare.
"Minnie"; sire, Gold Dust; dam, French mare.

SINGLE HORSE (GELDING OR MARE) IN HARNESS, OVER 15½ HANDS AND UNDER 16.

Toronto :

1st, Thorncliffe Stock Farm. Todmorden, "Ida Brock"; sire, Gen. Brock; dam, Blue.
2nd, James Kerr, Toronto.
3rd, R. M. Wilson, Delhi, "Rysdyk"; sire, Stanton, dam, Lady Norfolk by Buckshot Eclipse, etc.

London :

1st, R. McLean, Lucan; "Brown George" brown, foaled May, 1886; bred by Exhibitor; sire, Ridgewood; dam, Maud, by Brown Dick, etc.
2nd, R. M. Wilson, Delhi, "Rysdyk" (see above, Toronto).
3rd, R. Stewart, Embro.

SINGLE HORSE (GELDING OR MARE 15½ HANDS AND UNDER.)

Toronto :

1st, W. P. McClure, Woodstock, ',Oxford Jewell"; sire, Clear Grit; dam, by Brown Douglas.
2nd, Paxton & Anderson, Port Perry, "George B."
3rd, R. M. Wilson, Delhi, "Snip"; sire, Stanton; Dam Lady Norfolk.

MARE ANY AGE.

Toronto :

Thorncliffe Stock Farm, Todmorden, Ida Brock.

London :

W. Craddock, Thamesford.

STALLION 4 YEARS OLD AND UPWARD, NOT LESS THAN 15½ HANDS, WITH FIVE OF HIS PROGENY ANY AGE OR SEX.

1st, J. Craig, V. S., Hamilton, "Frank Ellis."
2nd S. B. Kaiser; Edmonton, "Cyclone"; sire, Wilkins Micawber; dam, Lady Morrill.

CARRIAGE HORSES.

Stallion 4 Years Old and Upwards, 16½ Hands and over.

Toronto

1st, Isaac Hisey, Creemore, "Wild Harry" (imp.) [49] (1265) ; bay, black legs; foaled in 1886. Bred by Henry Coverdale, Hag Farm, Kirby Moorside, Yorkshire, England ; sire, Emperor (1238) ; dam, by Ballot, etc.
2nd, A. C. McMillan, Erin, "Shining Light" ; sire, Wonderful Boy (534).
3rd, Frank Bassino, Argyle, "Lord Derwert" (1090) ; sire, General (117) ; dam, Daughter of Barnaby, (670).

London :

1st, W. & J. Freel, Thamesford.
2nd, T. D. Hodgins, London.
3rd, Robson & Ardell, London.

Ottawa :

1st, J. J. Anderson, Dominionville, "Clear Grit, Jr." ; sire, Clear Grit ; dam, by Cock of the Rock.
2nd, Nesbitt & McLaughlin, Winchester Springs.
3rd, W. J. Loughoan, Ottawa, "Joe B." foaled, 1884 ; bred by Exhibitor ; sire, Joe Brown ; dam, Best Tester, etc.

Stallion 3 Years Old.

Toronto :

1st, Abram Bean, Bright, "Peacock."
2nd, Cornelius Newhouse, Campbell's Cross, "George Rysdyk" ; sire, Ryshawk ; dam, Jennie.
3rd, Wesley Cline, Binbrook, "Whalebone ; sire, Conklin Boy ; dam, by Henry Clay Jr.

London :

1st, J. Routledge, Hyde Park.
2nd, J. B. Martyn, Masonville, "Rallywood" , sire, Ranelagh II ; dam, Kate by Longuile, etc.

Ottawa :

1st, R. Bothwell, Ottawa.
2nd, Robert Ness, Howick, Que ; "Scampton Conqueror" (1551) (vol. 3, Yorkshire Coach Stud Book.
3rd, H. J. Whitteker, North Williamsburgh.

Stallion, 2 Years Old.

Toronto :

1st, Samuel Strong, Edgeley, "Young Prince Alexander" ; sire, "Prince Alexander" ; dam by "Peacock."
2nd, Irving & Brown, Winchester, "Argyle" ; sire, "Wellington (1264)" ; dam' "Bragg."
3rd, John Matthews, Alloa, "Bay Bolton" ; sire, "Goddard" ; dam, "Cadmas."

London :

1st, W. & F. Row, Avon.
2nd, Daniel Maddock, Walnut.
3rd, Neil Graham, Glencoe, "Western Harry," foaled 1889 ; sire, "Western Wilkes ; dam, "Annie D.," by "Prince Arthur," etc.

Ottawa :

1st, Irving & Brown, Winchester.
2nd, Jos. Kern, Ironside.
3rd, John Nesbitt, Fallowfield.

Yearling Colt, Entire.

Toronto :

1st, Phillip D. Statts, Markham, "Prince Victor ; sire, "Prince Alexander ; dam, "Jean."
2nd, W. J. Cunningham, Edmonton, "Duke of Ontario" ; sire, "Peacock" ; dam by "Clear Grit."
3rd, George Baker, Simcoe, "Prince Lucks All" ; sire, "Lucks All" ; dam, "Nell."

London :

1st, W. McGuffin, Thorndale, "Falconer" 609 ; sire, "Sportsman" 299 ; dam, "Della," by "Hero," etc.
2nd, Geo. Baker, Simcoe, "Prince Lucks All." See above, Toronto.
3rd, N. Clarke, London.

Stallion, Any Age.

Toronto :

S. Strong, Edgeley, "Young Prince Alexander."

London :

J. Routledge, Hyde Park.

Ottawa :

R. Bothwell, Ottawa.

PAIR OF MATCHED CARRIAGE HORSES, NOT LESS THAN 16½ HANDS.

Toronto :

1st, Geo. H. Gooderham, Toronto, "Billy," and "Jack"; sire, "Sheneau."
2nd, W. D. Grand, Toronto.
3rd, Geo. A. Cox, Toronto, "Flash," and "Headlight"; sire, "Young Peacock."

OVER 16 HANDS.

London :

1st, W. H. Gorham, St. Marys.
2nd R. M. Wilson, Delhi, "Lucy," and "Daisy"; sire, "Stanton Jr."; dam, "Roxy," by "British Splender," etc.
3rd, W. E. Smith, Gravesend.

PAIR OF MATCHED CARRIAGE HORSES, NOT LESS THAN 15¾ AND UNDER 16½ HANDS.

Toronto :

1st, The B. G. Tisdale Co., Brantford, "Dick," and "Dan"; sire, "Dillard Wilkes."
2nd, R. M. Wilson, Delhi, "Lucy"; sire, "Stanton"; dam, "Rosy".
"Daisy"; sire, "Stanton"; dam, "Maud."
3rd, J. Ross Robertson, Toronto, "Maud"; sire, "Dalesman"; dam by "Cleveland Bay";
"Victor"; sire, "Dalesman"; dam by "Royal George."

PAIR MATCHED CARRIAGE HORSES (GELDINGS OR MARES) IN HARNESS, 15½ HANDS AND OVER.

Ottawa :

1st, P. P. Salter, Carleton Place.

PAIR OF MATCHED HORSES, (HACKNEYS OR HIGH STEPPERS) MARES OR GELDINGS, NOT LESS THAN 15½ AND NOT MORE THAN 15¾.

Toronto :

1st, C. R. McLean, M.D., Meaford.
2nd, W. D. Grand, Toronto.
3rd, W. C. Crowther, Toronto, "Bella" and "Fanny."

SINGLE HORSE (HACKNEY OR HIGH STEPPER), MARE OR GELDING, NOT LESS THAN 15 AND NOT MORE THAN 15¾.

Toronto :

1st, C. R. McLean, M.D., Meaford, "Piccadilly Snatch."
2nd, W. D. Grand, Toronto.
3rd, G. A. Case, Toronto, "Nightingale"; sire, "Terror"; dam by "Clear Grit."

GELDING 3 YEARS OLD.

Toronto :

1st, T. J. Chisholm, Hornby, "George"; sire, "Orange Boy" (imp.); dam, "Lady Cook."
2nd, R. W. Wilson, Delhi, "Billy Stanton"; sire, "Stanton"; dam, "Maud," by "Royal George," etc.
3rd, Morris, Stone & Welllington, Welland, "Prairie Wolf."

GELDING OR FILLY YEARS OLD.

London :

1st, J. McMillan, Botany.
2nd, J. McMillan, Botany.
3rd, R. M. Wilson, Delhi, "Billy Stanton." See above, Toronto.

Ottawa :

1st, A. Kennedy, Ottawa, "Sallie," by "Kentucky Sentinel"; dam, "Dollie."
2nd. Thos. Fairburn, Ottawa, "Mack," by "Kentucky Sentinel"; dam, "Black Maggie,' by "Green's Rescue," etc.
3rd, E. C. Grant, Ottawa, ——; sire, "Thorndale Prince"; dam by "Phil Sheridan," etc.

Filly, 3 Years Old.

Toronto:

1st, Geo. Andrew, Oakville, "Polly,"; sire, "Pure Gold"; dam by "Hambletonian."
2nd, W. C. Short, Salem, "Lulu"; sire, "Clear Grit."
3rd, G. S. Fuller, Huttonville, "Dot"; sire, "King Fairfield; dam, "Hazel."

Gelding, 2 Years Old.

Toronto:

1st, Cornelius Newhouse, Campbell's Cross, "Jimmie S."; sire, "Ryshawk"; dam, "Dollie."

Gelding or Filly, 2 Years Old.

London:

1st, R. H. Harding, Thorndale, "Duke," foaled May 7th, 1889: sire, "Royal Duke" (imp.); dam, "Rose," by "Albion," etc.
2nd, J. F. McFadden, Clandeboye.
3rd, W. Chambers, Currie's Corners, "Bella C."; sire, "Aspinwall"; dam by "Combination," etc.

Ottawa:

1st, W. C. Edwards, Rockland.
2nd, H. M. Mather, Hurdsman's Bridge.

Filly, 2 Years Old.

Toronto:

1st, John Smith, Campbell's Cross, "Flossie"; sire, "Gold Dust"; dam, "Lady Jess."
2nd, A. A. Gage, Mount Charles, "Lucy"; sire, "King Fairfield"; dam, "Susan."
3rd, A. A. Gage, Mount Charles, "May"; sire, "King Fairfield"; dam, "Fan."

Yearling Filly or Gelding.

Toronto:

1st, Fred Mowat, Toronto, "Victor;" sire, Prince Alexander; dam, Nettie.
2nd, Edward Phipps, Fairfield Plains, gelding.
3rd, R. Beith & Co., Bowmanville, "Maud;" sire, Gem, (imp.); dam, Jennie.

London:

1st, Wm, Campbell.
2nd, S. B. Fuller, Woodstock.
3rd, R. Smith Ettrick.

Ottawa:

1st, Edward Phipps, Fairfield Plains.
2nd, John Nesbitt, Fallowfield.
3rd, Robt. Hurdman, Hurdman's Bridge.

Brood Mare, 16 Hands and over with foal of same breed by her side.

Toronto:

1st, R M. Wilson, Delhi, "Nelly Stanton;" sire, Stanton, jr.; dam, Roxy by British Splendor, etc.
2nd, W. J. Thompson, Orkney, "Maud T.;" sire, Doctor; dam, Primrose.
3rd, John L. Noble, Springfield on the Credit, "Jennie;" sire, War Cry.

London:

1st, R. M. Wilson, Delhi, "Nelly Stanton;" see above, Toronto.
2nd, W. J. Campbell, Komoka.
3rd, W. and F. Row, Avon.

Ottawa:

1st, Thos. Fairburn, Billings Bridge, "Black Maggie;" sire, Green's Rescue: dam, a Black Jack mare,
2nd, Mr Stevenson, Ottawa.
3rd, J. S. Fenton, Leitrim.

Foal of 1891.

Toronto:

1st, R. M. Wilson, Delhi, "Dandy;" sire, Howson; dam, Nelly Stanton by Stanton, jr, etc.
2nd, W J. Thompson, Orkney, "Egbert;" sire, Crown Prince; dam, Maud T.
3rd, Moor & Harris, Oakville, "Monday;" sire, Stripling; dam, Belle.

London :

1st, R. M. Wilson, Delhi, "Dandy ;" see above, Toronto.
2nd, R. Smith, Ettrick.
3rd, Benj. Marlatt, New Sarum.

Ottawa :

1st, Thos. Fairburn, Billings Bridge, " ——— ;" sire, Norman Pilot Wilkes 2,398 ; dam, Black Maggie by Green's Rescue, etc.
2nd, Mr. Stevenson, Ottawa.
3rd, J. S. Fenton, Leitrim.

Single Carriage Horse (Gelding or Mare), in Harness 15¾ to 16½ Hands.

Toronto :

1st, Fred G. Cox, Toronto, Chestnut.
2nd, W. T. Murray, Toronto ; " ——— ;" sire, Galway.
3rd, B. G. Tisdale & Co., Brantford, "Bert ;" sire, The Wilson Horse.

Gelding or Mare, 15½ Hands and over, in Harness.

London :

1st, Artemus O'Neil, Birr.
2nd, T. G. Davey, London.
3rd, J. Conn, Alvinston, "Nettie J. ;" foaled 1887 ; sire, O. A. C., 2,072 ; dam by Tom Jefferson, etc.

Single Carriage Horse, 15½ Hands and over.

Ottawa :

1st, John Hutton, Ottawa.
2nd, M. Beauvois, Ottawa.
3rd, Jacob Erratt, Ottawa.

Single Carriage Horse (Gelding or Mare) in Harness, not less than 16½ Hands.

Toronto :

1st, Thos. Brownridge, Brampton.
2nd, Jas. Matthews, Acton, "Kate ;" sire, Sampson ; dam by Whalebone.
3rd, Gideon Ryder, Delhi, "Frank ;" sire, Waxwork ; dam, Style.

Mare, any age.

Toronto :

Thos. Brownridge, Brampton.

London :

R. M. Wilson, Delhi, "Nelly Stanton :" see above, Toronto.

Ottawa :

Wm. Mason & Son, Ottawa.

Best Stallion, 4 Years old and upwards, 16½ Hands and over with five of his progeny of any age or sex.

Toronto :

A. C. McMillan, Erin, "Shining Light ;" sire, Wonderful Boy, 534.

HUNTERS AND SADDLE HORSES.

Saddle Horse, (Gelding or Mare.)

Toronto :

1st, W. D. Grand, Toronto.
2nd, C. R. McLean, M.D., Meaford, "Vandeleur."
3rd, Wm. Hendrie, Hamilton.

London :

1st, D. H. Grand, London.
2nd, S. B. Fuller, Woodstock.

Ottawa :

1st, Capt. H. G. Bate, Ottawa, "Pat ;" dark brown, sire, Terror.
2nd, E. W. Judah, Hillhurst, Que.
3rd, Geo. Thompson, Ottawa.

HEAVY WEIGHT HUNTER UP TO 15 STONE.

Toronto:

1st, Fulcher & Beck, London.
2nd, W. D. Grand, Toronto.
3rd, W. D. Grand, Toronto.

London:

1st, Jno. Fulcher, London.
2nd, A. Beck, London.

Ottawa:

1st, Robt. Brown, Ottawa.

HUNTER LIGHT WEIGHT, UP TO 11 STONE.

Toronto:

1st, C. Shields, Toronto.
2nd, F. A. Campbell, V.S., Toronto, "Fanny;" sire, Caligular.
3rd, W. D. Grand, Toronto.

London:

1st, John Fulcher, London.
2nd, R. R. Abbott, London.

Ottawa:

1st, Wm. Davies, Ottawa.
2nd, W. E. Hayes, Ottawa.
3rd, Gabriel Dowler, Billings Bridge.

LADY'S SADDLE HORSE, RIDDEN BY LADY IF POSSIBLE.

Toronto:

1st, Fulcher & Beck, London, "Bonny."
2nd, T. C. Patteson, Toronto, "Cheesecake;" sire, Strachind (imp.); dam, Beauty.
3rd, W. D. Grand, Toronto.

London:

1st, R. R. Abbott, London.
2nd, John Fulcher, London.

HORSE, BEST LEAPER.

Toronto:

1st, F. A. Campbell, V.S., Toronto, "Fanny."
2nd, Fulcher & Beck, London.
3rd, F. A. Campbell, V.S., Toronto, "Glenora."

BEST SADDLE HUNTER OR LADY'S HORSE.

Toronto:

1st, C. Shields, Toronto.

SPECIAL PRIZES FOR HUNTERS JUMPING.

Light weight, green Hunters, carrying not less than 154 lb. Best performance over four successive jumps about 4 feet, etc.

Toronto:

1st, J. Fulcher, London.
2nd, Geo. Kennedy, Brampton, "Johnny Hunter."

Heavy weight green Hunters, carrying not less than 175 lb. Best performance over 6 successive jumps, etc.

Toronto:

1st, W. D. Grand, Toronto.
2nd, J. Fulcher, London.

Light weight qualified Hunters, carrying not less than 154 lb. Best performance over four successive jumps.

Toronto:

1st, J. Fulcher, London.
2nd, J. Fulcher, London.
3rd, A. H Bowman, Toronto, "Toronto"; sire, Terror.

Heavy weight qualified Hunter, carrying not less than 175 lb. Best performance over 6 successive jumps, etc.

Toronto :

1st, F. A. Campbell, V.S., Toronto.
2nd, J. Fulcher, London.

Hunters showing best performance over five successive jumps ; 5 feet ; catch weights ; minimum weights 140 lb.

1st, J. Fulcher, London.
2nd, F. A. Campbell, V.S., Toronto.

HORSES FOR GENERAL PURPOSES.

Gelding or Mare 4 Years Old and Upwards.

Toronto :

1st, J. Clark, Brampton, "Jenny" ; sire, Lincoln ; dam, Darling.
2nd, Wm. Johnston, Sweetsburg, "Dolly."
3rd, Eli Dolson, Alloa, "Polly" ; sire, Duke Cleveland ; dam, by Royal George, etc.

Stallion, 4 Years Old and Upwards.

Ottawa :

1st, Geo. Edie, Manotick, "Scotsman," [R. 32] ; bay ; stripe on face ; foaled May 14th, 1883 ; bred by Exhibitor ; sire, Sir William Wallace (imp.), [11] 1176 (806) ; dam, Jane of Manotick, [R. 25], by AI, alias King of the West, (imp.) [194] (524), etc.
2nd, J. A. Melvin, Winchester.
3rd, A. Sharpley, Gatineau Point.

Stallion, 3 Years Old.

Ottawa :

1st, Geo Eadie, Manotick, "Ontario Type" ; sire, Windsor, (imp.) [517] (2509) ; dam, Nellie of Manotick [R. 26], by Sir Wm. Wallace (imp.) [11] 1176 (806), etc.

Stallion, 2 Years Old.

Ottawa :

1st, John Keenan, Merivale

Stallion, any Age.

Ottawa :

1st, Geo. Eadie, Manotick, "Scotsman," [R. 32]. See above, Ottawa.

Filly or Gelding, 3 Years Old.

Toronto :

1st, Wm. Graydon, Alloa, "Queen Imperial" ; sire, Crown Imperial ; dam, Nancy Bell.
2nd D. Wilson, Seaforth, "Nettie" ; sire, Mohawk ; dam, Rosie.
3rd, J. Clark, Brampton, "Prince" ; sire, Lincoln ; dam, Darling.

Ottawa :

1st, Jas. Callander, North Gower, "Tilly" ; dark bay, foaled in 1888, bred by exhibitor ; sire, Little Jock Elliot (imp.) [936] (3768) ; dam, Annie, by Glasgow Geordie, etc.
2nd, Wm Allan, Hull, Quebec.
3rd, Thos. Padget, Lime Bank.

Filly or Gelding, 2 Years Old.

Toronto :

1st, J. Clark, Brampton, "Jess" ; sire. Jim L. ; dam, Belle.
2nd, A. Dolson, Alloa, ——— ; sire, Marquis ; dam by Whalebone.

Ottawa :

1st, John Nesbitt, Fallowfield.
2nd, G. T. Rainer, Aylmer, Que., "Maggie," bright bay, stripe on face, hind feet white, foaled May 20th, 1889 ; sire, Vanguard (4092) ; dam, Nellie, by Farmers' Fancy, etc.
3rd, John Hannan, Gloucester.

Yearling Filly or Gelding.

Toronto :

1st, J. Clark, Alloa, "Belle" ; sire, Young Canada, dam by Donald Dinnie.
2nd, F. Mowat, Toronto, "Queen" ; sire, Perfection ; dam, Polly.
3rd, H. Harrison & Sons, Brampton, "Gin" ; sire, Perfection ; dam, Nancy.

Ottawa :

1st, Thos. Padget, Lime Bank.
2nd, Wm. Allan, Hull, Que.
3rd, R. Allan, Hull, Que.

BROOD MARE WITH FOAL OF SAME BREED BY HER SIDE.

Toronto :

1st, M. Harrison & Sons, Brampton, "Nettie"; sire, Young England; dam, by Hard Fortune.
2nd, J. Clark, Brampton, "Maud;" sire, Lincoln; dam, Darling.

Ottawa :

1st, Jas. Callender, North Gower, "Annie," black, foaled in 1884, bred by Wm. Callander, North Gower, Ont.; sire, Glasgow Geordie; dam, Kate.
2nd, Wm. Allan, Hull, Que.
3rd, Thos. Padget, Lime Bank.

FOAL OF 1891.

Toronto :

1st, Jno. Clark, Alloa, "Bessie"; sire, Young Canada; dam by Donald Dinnie.
2nd, J. Clark, Brampton, "Dandy"; sire, Dandy Jim; dam, Maud.
3rd, M. Harrison & Sons, Brampton, "Cap."; sire, Shining Light; dam, Nettie.

Ottawa :

1st., Jas. Callander, North Gower, "Macgregor", bay, foaled April 17th, 1891, bred by Exhibitor; sire, Little Jock Elliott, (imp.) [936] (3768); dam, Annie by Glasgow Geordie, etc.
2nd, G. T. Radner, Aylmer, Que., "Farmer's Choice," bay, stripe on face, hind feet white; sire, Pride of Fenwick, (6157); dam, Nellie by Farmer's Fancy, etc.
3rd, John Padget, Lime Bank.

MATCHED TEAM, GELDINGS OR MARES IN HARNESS.

Toronto :

1st, Samuel Hannil, Sheffield, ———; sire, War Cry.
2nd, Jas. P. Lake, Morven.

Ottawa :

1st, Wm. Allan, Hull, Que.

MARE OR GELDING, ANY AGE.

Toronto :

M. Harrison & Sons, Brampton, "Cap."

Ottawa :

Jas. Callendar, North Gower.

AGRICULTURAL HORSES.

STALLION, 4 YEARS OLD OR UPWARDS.

Toronto :

1st. Chas. J. Croxal, Oro Station, "Capt. Nethetby"; sire, What's Wanted; dam, by Prince of Wales.
2nd. A. Bell, Agincourt, "Roderick"; sire, Scot Free, (imp.) [287] (1003); dam, Maud Bell.
3rd, Geo. Shaw, Toronto, "Pride of Canada"; sire, Prince of Kilbride, (imp.) [90] (1268); dam, Minnie P —363—.

STALLION, 3 YEARS OLD.

Toronto :

1st, Wm. Elliott, Stanley Mills, "Woodland."
2nd, Wm. Willis, Newmarket, "Dominion"; sire, Prince of Newbridge; dam by Cumberland.
3rd, Jos. Rowntree, Carleton West, "Young Perfection"; sire, Perfection: dam by England's Glory.

STALLION, 2 YEARS OLD.

Toronto :

1st, Geo. Crawford, Oro Station, 'Inkermann"; sire, Montrave Chief; dam, Bess of Oro Station.
2nd, Job White, Ashburn.
3rd, Geo. Wilson, Caledon East, "British Freedom"; sire, Freedom (4382); dam by Scotland's Glory.

YEARLING COLT, ENTIRE.

Toronto :

Prouse & Williamson, Ingersoll,

STALLION, ANY AGE.

Toronto :

Geo. Crawford, Oro Station, "Inkermann." See above, Toronto.

FILLY, 3 YEARS OLD.

Toronto :

1st, J. W. Linstead & Co., Queensville, "Smile"; sire, Bright Smile; dam by Robert the Banter.
2nd, Fred Mowat, Toronto, "Flora"; sire, Nelson; dam, Polly.
3rd, Wm. Chew, Weston, "Katie May"; sire, Darnley; dam by Hard Fortune.

GELDING OR FILLY, 3 YEARS OLD.

London :

1st, James Quirer, Kintore,

FILLY, 2 YEARS OLD.

Toronto :

1st, Wm. Mason, Ellesmere, "Topsy"; sire, Self-esteem; dam, Pleasant.
2nd, Geo. A. Wallace, Ponsonby, "May"; sire, Cowden Lad.
3rd, Alex. Doherty, Ellesmere, "Black Mary," 1088; sire, Self Esteem; dam, Maggie of Ellesmere.

GELDING OR FILLY, 2 YEARS OLD.

London :

1st, Jno. McLeod, Thamesford.
2nd, Simon Campbell, Farquhar, "Filly"; sire, Charming Charlie, (imp.) [1161] (4917); dam mare by Old Lord Haddo, (imp.) [49] 2697 (3872), etc.
3rd, Jas. Quirer, Kintore.

YEARLING FILLY OR GELDING.

Toronto :

1st, Geo. Crawford, Oro Station, "Rosebud"; sire, Grand Times.
2nd, Wm. Mason, Ellesmere, "Nellie S"; sire, Self Esteem; dam, Pleasant.

London :

1st, Prouse & Williamson, Ingersoll.

BROOD MARE WITH FOAL OF SAME BREED BY HER SIDE,

Toronto :

1st. Geo. Crawford, Oro Station, "Bess of Oro Station"; sire, Gen. Duke; dam, Dainty Bell.
2nd, Wm. Padget & Son, Buttonville, "Mary"; sire, Edinboro Toon; dam by Cornet.
3rd, Andrew Aitcheson, Inverhaugh.

London :

1st, Angus McTaggart, Appin, "Bess of Oro Station" —287—, bay, star on face, black points, foaled spring of 1883, bred by Elias Williams, Port Perry, Ont.; sire, General Duke, (imp.) [6] C. C. B., 1721 (1663); dam, Dainty Bet by Napoleon, (imp.) [78] C. S. B., etc.
2nd, T. Coursey, Lucan.

FOAL OF 1891.

Toronto :

1st, Geo. Crawford, Oro Station, "Golden Crown;" sire, Golden Gem; dam, Bess of Oro Station.
2nd, Geo. A. Wallace, Ponsonby, "Reform, jr;" sire, Reform; dam, Maud.
3rd, And. Aitcheson, Inverhaugh.

London :

1st, T. Coursey, Lucan.
2nd, Simon Campbell, Farquhar, "Filly;" sire, Pride of Glasnick; dam by Old Lord Haddo (imp.), [49] 2697 (3872), etc.

Matched-Team (Geldings or Mares) in Harness.

Toronto:

1st, John Hueson & Son, Grahamsville, "Bloss," and "Floss;" sire, Lord Derby; dam, Farmers Glory.
2nd, Josiah Oliver, Derry West, "Nett," and "Jennie;" sire, Tam O'Shanter.
3rd, And. Neilson, Hornby, "Charlie," and "Prince;" sire, Welshman (imp.)

London:

1st, Geo. Campbell, Rokeby, "Jean," bright bay; foaled, 1886; sire, Emigrant, (imp.) [4] (1648); dam by Sir Wm. Wallace, etc.
"Flora," bright bay; foaled, 1886: sire, Emigrant (imp.) [4] (1648); dam by Sir Wm. Wallace, etc.
2nd, Carling B & M. Co., London.
3rd, Anderson Bros., Littlewood.

Best Mare, Any Age.

Toronto:

Geo. Crawford, Oro Station, Bess of Oro Station.

London:

James Quirer, Kintore.

CLYDESDALES (IMPORTED OR CANADIAN BRED).

At London and Ottawa (this class includes both Clydes and Shires).

Stallion, 4 Years old and Upwards.

Toronto:

1st, R. Beith & Co., Bowmanville, "Sir Walter" (imp.) [1131] (8272); light brown, one fore foot and one hind foot white, stripe on face; foaled June 1st, 1886; imported 1889; bred by Jas. Crawford, Boreland Castle, Douglas, Scotland; sire, Bold Moghie (4259); dam, Jean of Boreland, by Zulu, etc.
2nd, James Addison, Toronto, "Macneilage" (imp.) [1117] (2992); brown, white face, fore foot and hind foot white; foaled June 25th, 1882; imported 1889, by Exhibitor; bred by Wm. Gray, Muncraig, Kirkcudbright, Scotland; sire, Macgregor (1487); dam, Jess (1295), by Crown Prince (207), etc.
3rd, R. Beith & Co., Bowmanville, "Eastfield Laddie (imp.) [1127] (6719); bay, white stripe on face, hind feet and part of legs white, near fore foot white; foaled May 2nd, 1887; imported 1889; bred by William Maxwell, Baraskomel, Campbeltown, Scotland; sire, Old Times (579); dam, Mary of Baraskomel (1884), by Richard III. (1802), etc.

London:

Clyde, 1st, E. W. & G. Charlton, Duncrief, "Wigton Lad" (imp.) [552] 6416 (5441) bay, three white feet; foaled June 27th, 1884: bred by John Murray, Port William, Scotland; imported 1886 by J. Vance, New Hamburg, Ont.; sire, Knight of Athole (2916); dam, Mall (5672) by Lord Lyon, (489,)
2nd, N. Norton, London.
3rd, Thos. Woodley, Brucefield, "Benjafield" [1668]; bay, star on face, hind feet white; foaled May 15th, 1887: bred by Exhibitor; sire, Macalpine (imp.) [1511] (2986); dam, Queen of Beauty (imp.) [1098] by Prince of Kilbride (imp.) [90] (1268), etc.
Shire, 1st, Dow & Willis, Exeter.

Ottawa:

1st, Robt. Ness, Howick, Que., "Prince of Eastfield" (imp.) (6183); dark bay, white on face; foaled June, 1885; bred by J. L. Imrie, Blackhill, Maryhill, Glasgow, Scotland: sire, Prince of Wales (673), by Jess of Blackhill (5175), by Young Lorne (997).
2nd, John Clark, Ottawa, "Windsor" (imp.) [547] (2509); bright bay, stripe on face, four white feet. Bred by J. McAlister, Little Kilmory, Bute, Scotland: imported in 1885 by Henry Jeffrey, Whitby; sire, Gen Neil (1143); dam, Bell *late* Jess (1530), by Young Lofty (987.)
3rd, S. Stewart, Aylmer, "Pride of Fenwick (imp.) (6157); bay, white face, hind legs white; foaled June 25th, 1885. Bred by J. Wilson, Glassoch, Fenwick, Ayrshire, Scotland; sire, Old Times (579): dam, Maggie, by Young Lord Lyon (994), etc.

Stallion, 3 Years Old.

Toronto:

1st, Thorncliff Stock Farm, Todmorden, "Energy" (imp.) [1432] (7691); bay, stripe on face, hind legs white; foaled July 1st, 1888. Bred by Wm. Hood, Chapelton, Borgue, Kirkcudbright, Scotland; imported in August, 1889, by Graham Bros., Claremont; sire, Macgregor (1487); dam, Rosie (513), by Pride of Kilbride (660), etc.
2nd, Graham Bros., Claremont, "Crosby Chief" (imp.) [1574] (7616); bay, white face and legs; foaled June 26th, 1888. Bred by R. B. Brockbank, Crosby, Maryport, Scotland, imported in August, 1890, by exhibitors; sire, Barcheskie (4827); dam, Maid of the Mist, *alias* Smiler (2918), by Prince of Kirkbean (1269), etc.

3rd, Graham Bros, Claremont, "Arbitrator" (imp.) [1124] (7430); bay, foaled June 15th, 1888. Bred by George Somers, Bogton Drum, Aberdeenshire, Scotland; imported in August, 1889, by Exhibitors; sire, Walwin (3284); dam, Belle, late Hawkie, by Hawkhead, by Prince of Wales (673), etc.

London:

1st, Thorncliff Stock Farm, Todmorden, "Energy" (imp.) [1432] (7691); see above, Toronto.
2nd, Jas. Henderson, Belton, "King of Zorra" (imp.) (7878); bay, stripe on face, three white feet; foaled May, 1888. Bred by John Park, Gilston, Polmont, Scotland; imported by E. Dingman, Maplewood, Ont.; sire, Macneil (4566); dam, Darling of Gilston (3150), by Jinglin Johnnie (403). etc.
3rd, Graham Bros., Claremont, "Crosby Chief" (imp.) [1574] (7616); see above, Toronto.

Ottawa:

1st, Thorncliff Stock Farm, Todmorden. "Energy" (imp.) [1432] (7691); see above, Toronto.
2nd, Robt. Ness, Howick, Que., "Barlocco" (imp.) [1667] (7461); brown, star on face, hind feet white; foaled May 1st, 1888; imported August, 1890, by Exhibitor. Bred by S. and R. Douglas, Barlocco Borgue, Kirkcudbright, Scotland; sire, Macpherson (3825); dam, Jean, by Lofty (460.)
3rd, Graham Bros, Claremont, "Crosby Chief" (imp.) [1574] (7616); see above, Toronto.

STALLION, 2 YEARS OLD.

Toronto:

1st, D. & O. Sorby, Guelph, "McNab's Heir" (imp.) [1590] (8825); dark brown, star on face, spot on nose, one hind foot white; foaled in 1889. Bred by Wm. Innes, Oldtown, Elgin, Scotland; imported in 1890 by Exhibitors; sire, MacNab (3824); dam, Love, by Earl of Rothes (1128), etc.
2nd, Graham Bros., Claremont, "Craigronald" (imp.) [1711] (8557); brown, stripe on face, hind feet white; foaled April 25th, 1889, imported 1891. Bred by John Montgomery, Compstonend, Twynholm, Kirkcudbright, Scotland; sire, Craigisla (6641); dam, Rosie of Compstonend (6536), by Macgregor (1487), etc.
3rd, Irving and Brown, Winchester, "Montrave Monk" (imp.) (8861); bay, white face, near fore and hind legs white, and off fetlocks white; foaled April, 19th 1889, imported 1891. Bred by John Gilmour, Montrave, Leven, Fifeshire, Scotland; sire, Macneilage (imp.) [1117] (2992); dam, Maggie II. (7624), by Farmer (286), etc.

London:

1st, Graham Bros., Claremont, "Craigronald" (imp.) [1711] (8557); see above, Toronto.
2nd, J. Snell, Clinton, "Chas. McKnight [1694]; bay, star on forehead, little white on right hind foot; foaled Sept. 4th, 1889. Bred by Exhibitor; sire, McKnight (imp.) [1693] (4046); dam, Bessie Lee (imp.) [22] by Bonnie Scotland (1076), etc.
3rd, H. Thompson, St. Marys, "Sir Patrick" (imp.) (9008); dark brown, ratch on face, hind feet and off fore foot white; foaled June 3rd, 1889. Bred by J. McNiven, Cardona, Blairdrummond, Scotland; sire, Sir Donald (3190); dam, Dolly (7576) by Gay Lad (2119), etc.

Ottawa:

1st, Robt. Ness, Howick, Que., "Lifeguard" (imp.) [1891] (9272); sire, Young Duke of Hamilton (4122); dam, Lily of the Valley (3233), by Prince Charlie (629), etc.
2nd, Graham Bros., Claremont, "Craigronald" (imp.) (1711) (8557); see above, Toronto.
3rd, Irving & Brown, Winchester.

YEARLING COLT, ENTIRE.

Toronto:

1st, Graham Bros., Claremont, "Symmetry (imp.) [1713], (9431); light bay, stripe on face, three white feet; foaled April 4th, 1890, imported 1891. Bred by W. McAdam, Whitepark, Castle Douglas, Scotland; sire, Ensign (5749); dam, Lady Fleet (6388), by Pride of Borgue, (2332), etc.
2nd, Graham Bros., Claremont, "MacCrone" (imp.) [1715], (9296); brown, stripe on face; foaled May 8th, 1890, imported 1891. Bred by Thomas Brown, Culraven, Borgue, Kirkcudbright, Scotland; sire, Macgregor (1487); dam, Lily of Culraven (7021), by Goodhope (1679), etc.
3rd, John Black, Coleraine, "Duke of Wellington" [1700]; light bay, stripe and star on face, off hind leg white, silver mane and tail; foaled May 24th, 1890. Bred by S. Shunk, Jr., Edgeley; sire, Nelson (imp.) [341] (2301); dam, Miss Fancy Grove [730], by What Care I (imp.) [493] (2612), etc.

London:

1st, Graham Bros., Claremont, "Symmetry" (imp.) [1713] (9431); see above, Toronto.
2nd, Graham Bros., Claremont, "MacCrone" (imp.) [1715], (9296); see above, Toronto.
3rd, Prouse & Williamson, Ingersoll.

Ottawa:

1st, Graham Bros., Claremont, "Symmetry" (imp.) [1713], (9431); see above, Toronto.
2nd, G. N. Kidd, Carp, "Duke of Huntley" [1733]; bay, stripe on face, four white feet; foaled May 20th, 1890. Bred by exhibitor; sire, Little Jock Elliott (imp.) [936] (3768); dam, Lady Louise [505], by Sir Wm. Wallace (imp.) [11] 1176 (806), etc.

Stallion, Any Age.

Toronto :

Thorncliffe Stock Farm, Todmorden, "Energy" (imp.) [1432] (7691.)

London :

E. W. & G. Charlton, Duncrief, "Wigton Lad" (imp.) [552] 6416 (5441.)

Special—Thoroughbred Stallion two Years old and over.

Ottawa :

Thorncliffe Stock Farm, Todmorden, "Energy" (imp.) [1432] (7691.)

Filly, 3 Years Old.

Toronto :

1st, Thorncliffe Stock Farm, Todmorden, "Edith" (imp.) [1322]; brown, star on face, white on hind feet, foaled May, 1888; imported 1890; bred by John Mark, Craigend Stow, Scotland; sire, Lord Lyndoch (4530); dam, Rosy of Rosyth (9537), by Culvennan Chief (2710), etc.
2nd, Graham Bros., Claremont, "Daisy" (imp.) [1652]; bay, white on face and hind legs; foaled June 11th, 1888; imported 1890; bred by A. Shaw, Low Ardwell, Stranraer, Scotland; sire, Belted Knight (1395); dam, Jean of Low Ardwell (6723), by Tom (877), etc.
3rd, Samuel Smillie, Hensall, "Evergreen" [1644]; light bay, star on face, four white feet; foaled May 19th, 1888; bred by exhibitor; sire, McAlpine (imp.) [1514] (2986); dam, Lady Corsewall (imp.) [191], by Corsewall (1420), etc.

Gelding or Filly, 3 Years Old.

London :

1st, Thorncliffe Stock Farm, Todmorden, "Edith" (imp.) [1322]; see above, Toronto.
2nd, John Oliver, Duncrief, "Rosie O" [720]; bay, stripe on face, near feet white; foaled May 14th, 1858; bred by exhibitor; sire, Corporal Logan (imp.) [848] (5271); dam, Lady Macgregor (imp.) [374], by Macgregor (1487), etc.
3rd, Geo. Duffield, Granton, "May Macgregor (imp.) (vol. 11, page 78); bay, stripe on face, hind legs white; foaled June 1st, 1888; bred by Jas. Hamilton, Boreland, Gatehouse, Scotland; sire, Macgregor (1487); dam, May Queen (3820), by Bonnie Scotland (1076), etc.

Ottawa :

1st, Thos. McKay & Co., Ottawa.
2nd, Thorncliffe Stock Farm, Todmorden, "Edith" (imp.) [1322]; see above, Toronto.

Filly, 2 Years Old.

Toronto :

1st, Thorncliffe Stock Farm, Todmorden, "Sweetheart" (imp.) [1326]; bay, white on face, hind legs white; foaled June, 1889; imported August, 1890; bred by W. Montgomery, Banks, Kirkcudbright, Scotland; sire, Macgregor (1487); dam, My Sweetheart (8894), by Scots Wha Hae (4006), etc.
2nd, Alex. Doherty, Ellesmere, "Miss Fleming" (vol. 12); bay, spot on face, white feet; foaled June 3rd, 1889; bred by And. Fleming, Corbiehall, Lanark, Scotland; sire, Master of Blantyre (2283); dam, Molly, by Lord Clyde (1741), etc.
3rd, Prouse & Williamson, Ingersoll, "Nell Muir; sire, Sir Everard (imp.) (5353); dam, Well (1514), by Britain (87), etc.

Gelding or Filly, 2 Years Old.

London :

1st, Thorncliffe Stock Farm, Todmorden, "Sweetheart" (imp.) [1326]; see above, Toronto.
2nd, A. B. Scott & Son, Vanneck, "Jean Armour" [1085]; brown, stripe on face, nigh hind foot white; foaled May 29th, 1889; bred by exhibitors; sire, Good Kind (imp.) [1133] (2836); dam, Kate H. of Congeith (imp.) [225], by Macgregor (1487), etc.

Ottawa :

1st, Thorncliffe Stock Farm, Todmorden, "Sweetheart" (imp.) [1326]; see above, Toronto.
2nd, Albert Hagar, Plantagenet, "Kate"; bay, star on face; foaled May 12th, 1889; bred by H. H. Spencer, Brooklin, Ont.; sire, Lawers Baron Gordon (imp.) [1005] (5136); dam, Boydston Bess, etc.

Yearling Filly or Gelding.

Toronto :

1st, D. & O. Sorby, Guelph, "Young Lily"; sire, McCamon (3818); dam, Lily of the Dale (4570), by Johnny (414), etc.
2nd, Thorncliffe Stock Farm, Todmorden, "Candor" (imp.) [1646]; brown, star on forehead, hind legs white; foaled May 4th, 1890; imported 1891; bred by J. Williamson, Langlands, Kirkcudbright, Scotland; sire, Macgregor (1487); dam, Darling (5148), by Farmer (288), etc.
3rd, Graham Bros., Claremont, "Miss Cameron" [1650]; bay, white face, little white on off forefoot and knee; foaled May, 1800; bred by Wm. Maw, Brooklin, Ont.; sire, Tannahill (imp.) [1205] (4745); dam, Ivy (imp.) [639], by Macfarlane (2988), etc.

London :

1st, Thorncliffe Stock Farm, Todmorden, "Candor" (imp.) [1646]; see above, Toronto.
2nd, Thos. Woodley, Brucefield, "Golden Daisy"; sire, Golden Crown; dam, Queen of Beauty (imp.) [1078], by Prince of Kilbride (imp.) [90] (1268), etc.

Ottawa :

1st, Thorncliffe Stock Farm, Todmorden, "Candor" (imp.) [1646]; see above, Toronto.

Brood Mare with Foal of Same Breed by her side.

Toronto :

1st, Alex. Cameron, Ashburn, "Mary's Pet" (imp.) [1643]; bay, ratch on face, forefeet and off hind leg white, spot on near hind leg; foaled May 21st, 1887; imported, 1889; bred by G. Smith, Muriefold, Tarves, Aberdeenshire, Scotland; sire, Cairnbrogie Stamp (4724); dam, Mary (1729), by Young Clyde (1359), etc.
2nd, Thorncliffe Stock Farm, Todmorden, "Lady Dunmore" (imp.) [1321]; light bay, white on legs and face; foaled May, 1887; bred by Wm. Kerr, Bandeath, Scotland; imported by Graham Bros., Claremont; sire, Earl Grange (4350); dam, Bandeath Fanny (8600), by Prince Charlie (634), etc.
3rd, Prouse & Williamson, Ingersoll, "Jean of Greenhill" (imp.) (9936); bay, ratch on face, legs white; foaled 1881; bred by Hugh McKellar, Portavadie, Tighnabruarch, Scotland; sire, Lord Marmion (1201); dam, sister to Sally of Millhouse (4781), by Heather Jock (1155), etc.

London :

1st, John Oliver, Duncrief, "Lady Macgregor" (imp.) [374]; bay, ratch on face, hind legs white; foaled June 1st, 1884; bred by Jas. Griffin, Jr., Mountain Tops, Cross Michael, Scotland; imported September, 1886, by exhibitor; sire, Macgregor (1487); dam, Sally (3554), by Pride of Galloway (601), etc.
2nd, Thorncliffe Stock Farm, Todmorden, "Lady Dunmore (imp.) [1321]; see above, Toronto.
3rd, Graham Bros., Claremont, "Nelly" (imp.) [970]; brown, ratch on face; foaled April 27th, 1886; imported August, 1889, by exhibitors; bred by J. Howat Hallbarnes, Killmarnock, Ayrshire, Scotland: sire, Laird of Bute (4490); dam, Maggie of Hallbarnes (7352), by Doncaster (238), etc.

Ottawa :

1st, Graham Bros., Claremont, "Nelly" (imp.) [970]; see above, London.
2nd, Thorncliffe Stock Farm, Todmorden, "Lady Dunmore" (imp.) [1321]; see above, Toronto.
3rd, Thos. Good, Richmond West, "Queen Vic." [410]; bay, stripe on face, white feet; foaled May 30th, 1887; bred by exhibitor; sire, The Montgomery (imp.) [182] 2784 (3254); dam, Belle of Richmond (imp.) [36] (3527), by Young Prince of Wales (3364), etc.

Foal of 1891.

Toronto :

1st, Thorncliffe Stock Farm, Todmorden.
2nd, Graham Bros. Claremont, "Lady Macneilage" [1649]; bay, stripe on face, hind legs white; foaled April 5th, 1891; bred by exhibitors; sire, Macneilage (imp.) [1117] (2992); dam, Nelly (imp.) [970], by Laird of Bute (4490), etc.
3rd, Prouse & Williamson, Ingersoll.

London :

1st, Graham Bros., Claremont, "Lady Macneilage" [1649]; see above, Toronto.
2nd, Prouce & Williamson, Ingersoll.
3rd, A. B. Scott & Son, Vanneck, "Moonlight"; sire, The Red Cross Knight [849]; dam, Kate II. of Congeith (imp.) [225], by Macgregor (1487), etc.

Ottawa :

1st, Graham Bros., Claremont, "Lady Macneilage [1649]; see above, Toronto.
2nd, Thorncliffe Stock Farm, Todmorden.

Mare with Two of Her Progeny, all to be the bona fide Property of Exhibitor.

Toronto :

Graham Bros., Claremont, "Ivy" (imp.) [639]; bay, white face and feet; foaled 1886; bred by James Finlay, Ross, Kirkcudbright, Scotland; imported in 1888 by exhibitors; sire, Macfarlane (2988); dam, Lily (3471), by Prince Imperial (1258), etc.

Span of Clydesdale (Geldings or Mares).

Toronto :

1st, Thorncliffe Stock Farm, Todmorden, "Barr Belle" (imp.) [1324]; light bay, stripe on face, hind legs white; foaled May 7th, 1888; bred by R. Callendar, Upper Barr, Newton Stewart, Scotland; imported August, 1890, by Graham Bros., Claremont; sire, Barney (4829); dam, Barr Jean (3314), by Chancellor of Blackhall (1094), etc.
"Nelly" (imp.) [1323]; bay, stripe on face, nigh hind foot white: foaled May, 1888; bred by Dalton Crosslee, Stow, Scotland; imported August, 1890, by Graham Bros., Claremont; sire, Lord Lynedoch (4530); dam, Maggie of Hyndford (1), by Young Lofty (987), etc.

2nd, Prouse & Williamson, Ingersoll, "Coylton Maid" (imp.) [794]; brown; foaled May 3rd, 1886; imported July, 1888; bred by J. McIlwraith, Meadowhead Coylton, Ayrshire, Scotland; sire, Gold (3657); dam, Lady Margaret (7544), by Old Times (579), etc.

"Theresa" [1196]; bay, white on face, three white legs; foaled May 29th, 1887; bred by exhibitors; sire, Nero (imp.) [1320]; dam, Daunby [813], by Lorne (imp.) [1078] (500), etc.

3rd, Laing & Meharry, Port Perry, "Cherry Lass" (imp.) [1269]; brown, small stripe on face, fore-legs mixed with white, hind legs white; foaled June 2nd, 1887; imported June, 1888; bred by Hugh Reid, Auchencorvie, Campbeltown, Scotland; sire, Old Times (579); dam, Bell of Auchencorvie (7754), by Lorne (499).

"Annie Park" (imp.) [976]; brown, ratch on face; foaled May 11th, 1887; imported in 1889; bred by W. S. Park, Hatton, Bishopton, Scotland; sire, Sir Hildebrand (4024); dam, Young Kate (8946), by British Commander (1981), etc.

London :

1st, Thorncliffe Stock Farm, Todmorden. "Barr Belle" (imp.) [1324]; see above, Toronto.

"Nelly" (imp.) [1323]; see above, Toronto.

2nd, Prouse & Williamson, Ingersoll.

Ottawa :

1st, Thorncliffe Stock Farm, Todmorden, "Barr Belle" (imp.) [1324]; see above, Toronto.

"Nelly" (imp.) [1323]; see above, Toronto.

2nd, A. T. White, Pembroke, "Bell" (imp.) [980]; sire, Sanguhar (2393); dam, Southbinch Bell (6136), by Morton (546), etc.

"Jenny Darnley" (imp.) [981]; sire, *Kilbride*; dam, Jenny Geddes (8468), by Darnley (222), etc.

3rd, Thos. McKay & Co., Ottawa.

Mare, any Age.

Toronto :

Thorncliffe Stock Farm, Todmorden, "Bessie Bell" (imp.) [1318] (7843)

London :

Thorncliffe Stock Farm, Todmorden, "Bessie Bell" (imp.) [1318] (7843).

Ottawa :

Thorncliffe Stock Farm, Todmorden, "Bessie Bell" (imp.) [1318] (7843).

Special—Imported or Canadian-Bred Clydesdale Stallion, 4 Years old and Upwards, with Five of his Progeny any Age or Sex.

Toronto.

1st, T. & J. Little, Mono Road, "Freedom" (imp.) (4382); bay, foaled 1883, imported 1886; bred by J. Cunningham, Whitecairn, Dalbeattie, Scotland; sire, Liberty (2222); dam, Maggie of Tarbreoch (4543), by Bonnie Scotland (1076) etc.

2nd, John Bell, L'Amaroux, "Ardlethan Boy" (imp.) [1314] (5493); bay, white face and legs, foaled June 2nd, 1886, imported August, 1889; bred by Thos. Garland, Ardlethan, Ellon, Scotland; sire, McCamon (3518); dam, Young Bloom of Ardlethan (3508), by Lord Derby (489), etc.

Stallion with Three of his get, any Age or Sex.

Ottawa :

John Clarke, Ottawa, "Baron of Auchendoir" (imp.) [476] (1577); dark brown, foaled 1876; bred by Chas. Coutlie, Dufftown, Banffshire, Scotland; imported May, 1882, by Hon. M. H. Cochrane, Hillhurst, Que.; sire, Garibaldi III (316), dam, Jess, by Walwin (900).

Special Sweepstakes for Clydesdales.

Best Canadian Bred Clydesdale Stallion, any age, recorded in the Clydesdale Stud-Book of Canada.

Toronto :

John & Jas. Boag, Ravenshoe, "Ben Bolt" [1326]; bay, white face, four white feet; foaled May, 1886; bred by Edward Atkinson, Brougham, Ont.; sire, Benmore (imp.) [315] (1948); dam, Sally [1199], by Clansmen (imp.) [265] 185, etc.

ENGLISH SHIRE HORSES (IMPORTED OR CANADIAN BRED).

Stallion 4 years old and upwards.

Toronto

1st, S. Hisey & Son, Creemore, "King Tom" (imp.) [107]; brown, stripe on face, three white legs; foaled in 1883; bred by Geo. Hudson, Cherry Burton, Eng.; imported Sept. 1884, by John Donkin, Riverview, Ont.; sire, King Tom (2446); dam, Topper, by Lincoln, *alias* Hercules (1350) etc.

2nd, Geo. Garbutt, Thistletown, "Darnley" (imp.) [183] (3585); brown; foaled in 1882; imported in 1881; bred by Thomas Johnson, Walton, Peterboro', Eng.; sire, Champion (450); dam, by Thunder (2137).

3rd, Morris, Stone & Wellington, Welland "Chieftain Second" (imp.) [194] (5723); blaze on face, nigh fore foot and hind feet white; foaled in 1884; imported in 1887; bred by Wm. Riley, Boulton Derby, Eng.; sire, Champion (457); dam, mare by Waxworth (2306), etc.

Stallion, 3 Years old.

Toronto:

1st, Morris, Stone & Wellington, Welland, "Prince Charles" [196]; bay, stripe on face, left hind foot and fore feet white; foaled in 1888; bred by exhibitors; sire, Carton (3523); dam, Lancashire Lass, by Honest Tom (1105), etc.

2nd, D. B. Birrell, York Mills, "Sizergh Tom" (imp.) [219]; stripe on face; foaled 1888; bred by John Blezard, Mill Dam, near Kendal, Westmoreland, Eng.; sire Bank of England (4841); dam, Jess (Vol. XI.), by Rovalist (2488), etc.

Stallion, 2 Years old.

Toronto:

1st, Morris, Stone & Wellington, Welland, "Pelham Boy" [226]; black, foaled 1889; bred by exhibitors; sire, Chieftain 2nd (imp.) [194] (5723); dam, Lancashire Lass (imp.) [70]; by Honest Tom (1105) etc.

2nd, D. B. Birrell, York Mills, "C. A." (imp.) [220]; bay, stripe on face, hind feet white; foaled 1889; bred by Thos. A. Cook, Chesham House, near Kirkham, Lancashire, Eng.; imported Dec., 1890, by Thos. Gibson, Middleton and Teasdale, Darlington, Eng.; sire, Northern King (2635); dam, Nellie, by Marauder (3852), etc.

Stallion, 2 Years old.

Toronto:

1st, Morris, Stone & Wellington, "Stanley" [197]; black, white face, fore feet white; foaled 1890; bred by exhibitors; sire, Chieftain 2nd (imp.) [194] (5723); dam, Lancashire Lass (imp.) [70], by Honest Tom (1150).

Stallion, any age.

Toronto:

S. Hisey & Son, Creemore, "King Tom" (imp.) [107]. See above.

Filly, 3 Years Old.

Toronto:

1st, James Patterson, Islington, "Rosa"; sire, Darnley; dam, by Hard Fortune (imp.) [13].

Filly, 2 Years old.

1st, Horace N. Crossley, Rosseau, "Sapphire" (imp.) [79]; light bay, white face, hind feet white; foaled 1889, imported 1891; bred by J. E. Shaw, Brooklands Farm, Hollywell Green, Halifax, Eng.; sire, Northern King (2635); dam, Jewel, by Master Tom (5202), etc.

2nd, Morris, Stone & Wellington, Welland, "Queen" [165]; brown, stripe on face, hind legs white, foaled spring of 1889; bred by exhibitors: sire, Chieftain 2nd (imp.) [194] (5723); dam, Elsie Morin (imp.) [34], by Welton Tom (3395) etc.

Yearling Filly or Gelding.

Toronto:

1st, Morris, Stone & Wellington, Welland, "Lina" [81]; brown, star on face, hind legs white; foaled 1890; bred by exhibitors; sire, Chieftain 2nd (imp.) [194] (5723); dam, Alice, (imp.) [33], by Adam (65), etc.

Brood Mare with Foal of same Breed by her side.

Toronto:

1st, Walter Glendenning, Ellesmere, "Topsy" (imp.) [52]; bay, foaled 1876, imported 1880; bred in Warwickshire; sire, King of the Valley (1248).

2nd, Morris, Stone & Wellington, Welland, "Lancashire Lass" (imp.) [70]; bay, white face, left front foot and hind feet white; foaled in 1880, imported in 1887 by exhibitors; bred by Thomas Howard, Preston Lane, Eng.; sire, Honest Tom (1105); dam, mare by Ploughboy (1745).

Foal of 1891.

Toronto:

1st, Morris, Stone & Wellington, Welland, "Daisy" [82]; brown, white face, hind legs white; foaled spring of 1891; bred by exhibitors; sire, Chieftain 2nd (imp.) [194] (5723); dam, Elsie Morin (imp.) [34], by Welton Tom (3395), etc.

2nd, Walter Glendenning, Ellesmere, " ——— "; sire, King of the Castle (imp.) [71] (3171); dam Topsy (imp.) [52], by King of the Valley (1248).

Mare with Two of her Progeny, all to be the Bona Fide Property of Exhibitor.

Toronto:

1st, Morris, Stone & Wellington, Welland, "Lancashire Lass" (imp.) [70]. See above, Toronto.

SPAN OF SHIRE HORSES (GELDINGS OR MARES).

Toronto.

W. Hendrie, Hamilton, "Princess Beatrice"; sire Duke of Lancaster (2566); dam, Princess Victoria, by Samson;
"Bess of Winona"; sire, Duke of Lancaster (2566); dam, Countess Blyth, by Duke of Wellington (2324).

MARE, ANY AGE.

Toronto:

W. Hendrie, Hamilton, "Princess Beatrice." See above.

SPECIAL PRIZES—ENGLISH SHIRE HORSES (IMPORTED OR CANADIAN BRED).

Best Stallion, 4 years old and upwards, with Five of his Progeny any Age or Sex.

Toronto:

1st, Geo. Garbutt, Thistletown, "Darnley" (imp.) [183] (3585). See above, Toronto.
2nd, Morris, Stone & Wellington, Welland, "Chieftain 2nd" (imp.) [194] (5723). See above, Toronto.

HEAVY DRAUGHT HORSES, CANADIAN BRED ONLY.

STALLION, 4 YEARS OLD AND UPWARDS.

Toronto.

1st, John and James Boag, Ravenshoe, "Ben Bolt" [1326]. See above, Toronto.
2nd, Wm. Jackson, Cardwell, "Dugald" [796]; dark bay, stripe on face, little white on hind legs, foaled April 28th, 1887; bred by D. & R. McGeachy, Castlemore; sire, Lochhill (imp.) [532] (2950); dam, Maggie Chiskin (imp.) [367] (5585), by Farmer's Fancy (302) etc.

Ottawa:

1st, W. Blakely, Billerica, Que.
2nd, Geo. Eadie, Manotick, "Walwin" [R33]; dark brown, white face, two white feet; foaled May 30th, 1885; bred by exhibitor; sire, Baron of Auchenoir (imp.) [176] (1577); dam, Jane of Manotick [R25], by A 1 *alias* King of the West (imp.) [194] 524, etc
3rd, Robert Thompson, Ottawa.

STALLION, 3 YEARS OLD.

Toronto:

1st, John McMillan, Queensville, "Dandy Bob" [1458]; bay, stripe on face, foaled June 10th, 1888; bred by exhibitor; sire, Rob the Ranter (imp.) [429] 1168, (1803); dam, Whitecairn Min [1367], by Whitecairn (imp.) [880] (3293), etc.
2nd, S. Wilson, Thornhill, "Perth 2nd"; brown, small stripe on face, white feet; foaled in 1888; bred by F. Nichols, Victoria Square, Ont.; sire Pride of Perth (imp.) [282] 2264, (2336).

London:

1st, T. McMichael, Seaforth, "Dutchman"; bay, star on face, hind legs white; foaled July 20th, 1888; bred by Jas. Snell, Constance, Ont.; sire, Rankin Boy (imp.) [1753] (3119); dam, Dolly, by Enterprise —332— etc.
2nd, R. Corcoran, Napier, "Emigrant" [R81]; brown: bred by exhibitor; sire, Emigrant (imp.) [4] (1648); dam, by Dainty Davie (imp.) [352] 630.
3rd, R. Melville, Maplewood.

STALLION, 2 YEARS OLD.

Toronto:

1st, Job White, Ashburn.
2nd, H. G. Boag, Queensville, "The Good Times" —272—, bay, spot on face, hind feet white; foaled April, 1889; bred by exhibitor; sire, Grand Times (imp.) [363] (3670); dam, Bonnie B —326—, by Sir James (imp.) [167], etc
3rd, John Jordan, Brechin, "Young Never Too Late"; sire, Young Ivanhoe (imp.) [253] 1706, (1887); dam by Dumfriesshire Jock (imp.) [116] (523), etc.

London:

1st, John Hodgins, Clandeboye.
2nd, T. McMichael, Seaforth, "Clear the Track"—321—, bay, stripe on face, one fore and one hind foot white; foaled May 7th, 1889; bred by exhibitor; sire, Kenilworth (imp.) [1441] (2187); dam, Queen—303—, by King of the Dominion, (imp.) [9], etc.

Ottawa:

1st, D. Campbell, Vernon.
2nd, R. Revington, Merivale, "———"; sire, Windsor (imp.) [547] (2509).

YEARLING COLT, ENTIRE.

Toronto :

1st, Wm. Maw, Brooklin, "Brooklin Boy"; sire, Tannahill (imp.) [1205] (4745); dam, Kate [65] by Surprise (imp.) [226] 19 (845), etc.
2nd, Saml. McArthur, Oro Station, "Grand Times II"—345—; bay, ratch on face, hind legs white; foaled May 1st, 1890; bred by exhibitor; sire, Grand Times (imp.) [363] (3670); dam, Silver Tail —293—, by Comyn Macgregor (imp.) [657] (3535), etc.
3rd, James Burrows, Cherrywood.

London :

1st, Prouse & Williamson, Ingersoll.
2nd, Geo. Carrie, Ballymote.

STALLION ANY AGE.

Toronto :

John & J. A. Boag, Ravenshoe, "Ben Bolt," [1326]. See above, Toronto.

London :

Thos. McMichael, Seaforth, "Dutchman." See above, London.

Ottawa :

W. Blakely, Billerica, Quebec.

SPECIAL.—HEAVY DRAUGHT STALLION, CANADIAN-BRED, ANY AGE.

Ottawa :

W. Blakely, Billerica, Que.

FILLY, 3 YEARS OLD.

Toronto :

1st, J. W. Linstead & Co., "Queensville Sis"; sire, Rob the Ranter (imp.) [429] 1168 (1803); dam by General Roberts (imp.) [169] (1664).

GELDING OR FILLY, 3 YEARS OLD.

London :

1st, Hider & Parkins, Oxford Centre, "Lady Bess," bright bay; sire, Lord Beresford (imp.) [1410] (4178); dam, Nell by Captain, etc.

FILLY, 2 YEARS OLD.

Toronto :

1st, Wm. Milliken, Hagerman, "Blanch"; sire, Richmond; dam, Jin.
2nd, Wm. Carstairs, Bomanton, "Lady Abbott"—310—; dark bay, stripe on face, white feet; foaled Spring, 1888; bred by D. Carstairs, Bomanton, Ont.; sire, Abbott of Renwick (imp.) 595] C.C.B., (5474); dam, Lily—125—, by Royal Exchange *alias* Ben Lomond (imp.) [101] C.S.B., etc.
3rd, Samuel Smillie, Hensall. "Myrtle"; sire, Golden Crown (imp.) [362] (3658); dam by Good Cheer (1678).

GELDING OR FILLY, 2 YEARS OLD.

London :

1st, John Hodgins, Clandeboye.

2nd, Hider & Parkins, Oxford Centre, "Rose"; bright bay, blaze on face; sire, Lord Beresford (imp.) [1410] (4178); dam, Nell by Captain, etc.
3rd, John Gunning, Frome.

GELDING OR FILLY, 2 YEARS OLD.

Ottawa :

1st, D. A. Cameron, Manotick.
2nd, D. Cumming, Russell.

YEARLING FILLY OR GELDING.

Toronto :

1st, Jas. Beith. Bowmanville, "———"; sire, Tannahill (imp.) [1205] (4745).
2nd, T. & J. Little, Mono Road.
3rd, Prouse & Williamson, Ingersoll.

London :

1st, Hider & Parkins, Oxford Centre, "Queen," brown, stripe on face, three white feet; sire, Custodian (imp.) [1762] (4948); dam, Nell by Captain, etc.
2nd, Prouse & Williamson, Ingersoll.

Ottawa :

1st, Thos. Todd, Richmond West, "Lady Elliot," sire. Little Jock Elliott (imp.) [[illegible]] [illegible]; dam, Kate by Sir Wm. Wallace (imp.) [11] 1176 (806), etc.

Brood Mare with Foal of same Breed by her side.

Toronto :

1st, Jno. Bone, Edgeley, "Bet of Edgeley" [621]; dark brown. stripe on face, four white legs; foaled April 28th. 1885; bred by exhibitor; sire, Dandy Jim (imp.) [239] 2748, (3271); dam, Fanny of Victoria Square, by Marquis (imp.) [247] 32, (517), etc.
2nd, William Maw, Brooklin, "Kate" [65], bay, star on face, one hind foot white, foaled May 24th, 1884; bred by Wm. Langmaid, Courtice; sire, Pride of Perth (imp.) [282] 2264 (2336); dam, Nelly by Surprise (imp.) [226] 19, (845), etc.
3rd, Robt. Mothersell, Alloa, "———"; sire KnockdonKing (imp.) [665] (3744); dam, Lucy.

London :

1st, Hilder & Parkins, Oxford Centre; "Nell": bay; sire, Captain, etc.
2nd, S. Campbell, Farquhar.

Ottawa :

1st, Rich'd. Bowden, Bearbrooke, "Jean"; sire, Goodcheer (imp.) (1678).
2nd, Wm. Allan Hull, Que.
3rd, Thos. Todd, Richmond West, "Kate"; sire Sir William Wallace (imp.) [11] 1176 (806), etc.

Foal of 1891.

Toronto :

1st, John and James Boag, Ravenshoe.
2nd, Wm. Maw, Brooklin.
3rd, Robt. Mothersell, Alloa.

London :

1st, Hider & Parkins, Oxford Centre, "Maud"; brown, one white foot; sire, Custodian (imp.) [1762] (4948); dam, Nell by Captain, etc.

Ottawa :

1st, Thos. Todd, Richmond West, "Little Lady"; sire, Little Jock Elliott (imp.) [936] (3758); dam Kate by Sir Wm. Wallace (imp.) [11] 1176 (806), etc.
2nd, Rich'd. Bowden, Bearbrooke, "———"; ———; dam, Jean by Goodcheer (imp.) (1678), etc.
3rd, Wm. Allan, Hull, Que.

Mare with two of her Progeny, all to be bona fide Property of Exhibitor.

Toronto :

1st, Wm. Maw, Brooklin, "Kate" [65]. See above, Toronto.

Span of Heavy Draught Horses, Gelding or Mares.

Toronto :

1st, Jas. McIntosh, Toronto, "Kate"; sire, Bouncer.
"Prince"; sire, Bouncer.
2nd, Wm. Hendrie, Hamilton, "Lancashire Belle 411—, by Duke of Lancaster (2566); dam, by Honest Tom.
"Blackwatch"; sire Seafield; dam by Old England.
3rd, Wm. Hendrie, Hamilton, "———"; sire, Darnley (imp.) [183] (3585).
"———" do

London :

1st, D. A. Murray; sire, Harrington.
2nd, R. Ross, Rodgerville.
3rd, John Gunning, Frome.

Ottawa :

1st, Thos. McKay & Co., Ottawa.
2nd, Thos. McKay & Co., Ottawa.
3rd, R. Rivington, Merrivale, "Maud" "Jim" } sire, King of the Princes.

Special.—Team of Heavy Draught Horses or Geldings, open to all.

Ottawa :

Thorncliffe Stock Farm, Todmorden, "Barr Belle (imp.) [1324] "Nelly" (imp.) [1323] } See above, Toronto.

Mare Any Age.

Toronto :

Wm. Milliken, Hagerman, "Blanch." See above, Toronto.

London

Hider & Parkins, Oxford Centre, "Lady Bess." See above, London.

Ottawa :

Rich'd. Bowden, Bearbrook, "Jean." See above, Ottawa.

SUFFOLK PUNCH HORSES, IMPORTED OR BRED FROM PURE IMPORTED STOCK.

Stallion 3 Years Old and Upwards.

Toronto :

1st, Jos. Beck, Thorndale, "Venture" (1883); sire, Warsham (1430); dam, Promise (75), Oxford's Britain (916).
2nd, J. A. Melvin, Winchester, "Bankers Boy" (1912); sire, The Banker (1444); dam, Matche II. (699), etc.
3rd, Jos. Beck, Thorndale, "Enterprise" (1934); sire, Stormer (1628); dam, Bragg, etc.

Stallion 4 Years Old and Upwards.

London :

1st, Jos. Beck, Thorndale, "Venture" (1883). See above, Toronto.
2nd, Jos. Beck, Thorndale, "Enterprise" (1934). See above, Toronto.

Stallion 2 Years Old.

London :

1st, A. Salmon, Thorndale, "Vivacity (2027); sire, Invader (1439); dam, Violet (2338).

Stallion Any Age.

Toronto :

Jas. Beck, Thorndale, "Venture." See above, Toronto.

Mare 3 Years Old and Upwards.

Toronto :

1st, Mossom Boyd & Co., Bobcaygeon, "Maud" (2377); sire, Cross' Invader (1439); dam, Vanity (1630), etc.
2nd, Mossom Boyd & Co., Bobcaygeon, "Baroness" (1320); sire, Walton's Royalty (1339); dam. Brilliant (1061).

Filly 2 Years Old.

Toronto :

1st, Mossom Boyd & Co., Bobcaygeon, "Princess" (2621); sire, Cross' Invader (1439); dam, Patch (1536), etc.

Brood Mare with Foal of same Breed by her side.

Toronto :

1st, Jos. Beck, Thorndale, "Vanity" (1630); sire, 'Cupbearer 3rd (566); dam, Venture (922), by Monarch (1348), etc.

London :

1st, Jos. Beck, Thorndale, "Vanity" (1630). See above, Toronto.

Foal of 1891.

Toronto :

1st, Jos. Beck, Thorndale, "Ontario"; sire, Enterprise (1934); dam, anity (1630), etc.

London :

1st, Jos. Beck. Thorndale, "Ontario." See above, Toronto.

Mare Any Age.

Toronto :

Jos. Beck, Thorndale, "Vanity" (1630). See above, Toronto.

London :

Jos. Beck, Thorndale, "Vanity" (1630). See above, Toronto.

PERCHERON OR FRENCH DRAUGHT HORSES.

Stallion 3 Years Old and Upwards.

Toronto :

1st, T. W. Wambold, Berlin, "Solomon"; sire, Hercules; dam, Marie.
2nd, J. M. & D Parker, Stamford; sire, Arthur, 13975.

Stallion Any Age.

Toronto :

T. W. Wambold, Berlin, "Solomon." See above.

HACKNEY STALLIONS.

Imported Stallion, 4 years Old and Upwards.

Toronto :

1st, R. Beith & Co., Bowmanville, "Jubilee Chief" (2122); sire, Pilot (1323); dam, Queen of the Forest (297), etc.
2nd, Graham Bros., Claremont, "Neptune II" (2608); sire, Norfolk Gentleman (492); dam, Cybele (23) etc.
3rd, D. & O. Sorby, Guelph, "Mid Norfolk Swell II ",(2595); sire, Young Redoubt (2787); dam, Bess

Stallion 3 Years Old.

Toronto :

1st, Graham Bros., Claremont, "Dundrennan" (2959); sire Dorrington II (956); dam, Cigarette 210), etc.

Stallion 2 Years Old.

Toronto :

1st, Graham Bros, Claremont, "Lavender" (3076) sire, Donald Grant (1573); dam, Ellangowan (431), etc.

Stallion any Age.

London :

1st, Graham Bros., Claremont, "Neptune II" (2608). See above Toronto.
2nd, Jos. White, St. Marys, "Real Confidence" (imp.) (2652); brown, foaled 1887, bred by J. A. Gibson, Weslan Spalding, Lincolnshire, England; sire, Whaplode Confidence (1594); dam, Kitty by Perfection (545), etc.
3rd, Jos. Beck, Thorndale.

Stallion, any Age.

Ottawa :

J. D. McPhail, Vernon.

CATTLE.

SHORT HORNS.

Bull, 4 Years Old and Upwards.

Toronto :

1st, J. & W. Russell, Richmond Hill, "Stanley" *alias* "Oliver Mowat" =7949=, dark roan, calved June 23rd 1886. Bred by Jos. Redmond, Peterboro'; sire, Challenge =2933=; dam, Wimple Fifteenth (imp.) =5234=. by British Flag (46009), etc.
2nd, J. & W. B. Watt, Salem—"Challenge" =2933=, roan, calved Dec. 30th, 1882. Bred by exhibitors; sire, Barmpton Hero =324=; dam, Matchless of Elmhurst Second =3883=, by Baron Loun Third =338=, etc.
3rd, H. & W. D. Smith, Hay, "Prince Albert" =3669=, roan, calved Oct. 2nd, 1882. Bred by Alex. Brockie, Fergus; sire, Barmpton Hero =324=; dam, Butterfly =5562=, by Under Sheriff =1129=, etc.

Bull, 3 Years Old and Upwards.

London :

1st, J. & W. B. Watt, Salem, "Challenge" =2933=. See above, Toronto.
2nd, Thorncliffe Stock Farm, Todmorden, "Northern Light" (imp.) =11111= (57801). See below, Toronto.
3rd, H. & W. D. Smith, Hay, "Prince Albert =3669=. See above, Toronto.

3 Years Old and Upwards.

Ottawa :

1st, W. C. Edwards & Co., Rockland, "Grandeur" (imp. in dam) = =; red, calved April 14th, 1888, Bred by E. Cruickshank, Letherby, Aberdeen, Scotland, imported in dam by John Dryden, Brooklin, Ont., got by Patriot (imp.) =9409= (53390) dam Fox Glove (imp.) =11026=, by Perfection (37185), etc.
2nd, Thorncliffe Stock Farm, Todmorden, "Northern Light (imp.) =11111= (57801). See below, Toronto.
3rd, A. T. White, Pembroke, "Victor Hubert" =11850=, dark roan, calved April 6th, 1888. Bred by Arthur Johnston, Greenwood, Ont.; got by Royal Victor (imp.) =1126= (53611); dam, Victoria 60th (imp.) =5220=, by Achilles (40951), etc.

Bull, 3 Years Old and Under 4.

Toronto :

1st, Jas. Rennie, Wick, "Gravesend's Star" (imp. in dam) =6372=, red and little white, calved Dec. 16th, 1887. Bred by Jos. Redmond, Peterboro', at Kineller, Aberdeen, Scotland, imported in 1887; sire, Gravesend (46161); dam, Princess of Wales Eighth (imp.) =11072=, by Goldfinder (47967), etc.

2nd, Thorncliffe Stock Farm, Todmorden, "Northern Light" (imp.) =11111=(57801), red, calved March 17th, 1888. Bred by A. Cruickshank, Sittyton, Aberdeen, Scotland; got by Standard Bearer (55096); dam, Nonpareil 20th, by Cumberland (46144), etc.

Bull, 2 Years Old and Under.

Toronto :

1st, Eastwood Bros., Mimico, "Cromwell" =11792=, roan, calved January 4th, 1889. Bred by R. & S. Nicholson, Sylvan; got by Warrior (imp.) =4133= (55173); dam, Vacuna 11th =14038=, by Prince Albert =3669=, etc.

2nd, Jas. Oke & Sons, Alvinston, "Ironclad"=13347=, red and little white, calved Jan. 20th, 1889. Bred by Jas. Gardhouse & Sons, Highfield. Got by Eclipse (imp.) =1251= (49526); dam, Mary Anne of Lancaster 12th (imp.) =5171= ; by Victory (48871), etc.

3rd, H. K. Fairbairn, Thedford, "Royal Albert" =13020=, red, calved January 23rd, 1889. Bred by Arthur Johnston, Greenwood; got by Albert Victor =6315= (55250); dam, Mary Anne of Lancaster 13th = =, by Victory = = (48871), etc.

London :

1st, Eastwood Bros., Mimico, "Cromwell" =11792=. See above, Toronto.

2nd, J. Crearer, Shakespeare, "Nobleman" =13130=, roan, calved Jan. 16th, 1889. Bred by J. & W. Russell, Richmond Hill, got by Tofthills (imp.) =11113= (56656); dam, Isabella 14th =13944=, by Royal Booth 2nd =3818=, etc.

3rd, H. K. Fairbairn, Thedford, "Royal Albert" =13020=, red, calved Jan. 23rd, 1889. Bred by Arthur Johnston, Greenwood, Ont., got by Albert Victor (imp.) =6315= (55250); dam, Mary Anne of Lancaster 13th (imp.) =5172=, by Victory (48871), etc.

Ottawa :

1st, Jas. Oke & Son, Alvinston, "Ironclad" =13347=. See above, Toronto.

2nd, D. P. McPhail, Vernon.

Bull, 1 Year Old.

Toronto :

1st, R. & S. Nicholson, Sylvan, "Nonpareil Chief, =13669=, roan, calved Jan. 28th, 1890. Bred by Arthur Johnston, Greenwood, Ont.; got by Indian Chief (imp.)=11108= (57485); dam, Nonpareil 36th (imp.) =5186=, by Gladstone (43286), etc.

2nd, G. & W. Grier, Grand Valley, "Lowland Chief" =13825= ; rich roan, calved Nov. 21st, 1889. Bred by Arthur Johnston, Greenwood, Ont.; got by Indian Chief (imp.) =11108= (57485); dam, Eda =11585= by Cremorne (imp.) =1233= (51045), etc.

3rd, J. & W. B. Watt, Salem, "Village Hero," =14342=, red, calved Dec. 13th, 1889. Bred by exhibitors; sire, Prince Albert =3569=; dam, Village Blossom (imp.) =2277=, by Ben Wyvis (30528), etc.

London :

1st, R. & S. Nicholson, Sylvan.

2nd, T. Douglas & Son, Strathroy, "Roy Vincent"=13423= ; red roan, calved Jan. 11th, 1890. Bred by exhibitors; got by Mariner (imp.) =2720= ; dam, Fashion Duchess 5th =9087=, by Third Lord Red Rose =3461=, etc.

3rd, J. Morgan & Son, Kerwood.

Ottawa :

1st, A. Hagar, Plantagenet, "Proud Duke" =14483= ; red, calved March, 1890. Bred by H. H. Spencer, Brooklin, Ont; got by Sussex (imp.) =6438= (56625); dam, Isabella 4th =9309=, by Pride of Ontario =2216=, etc.

2nd, D. P. McPhail, Vernon.

Bull Calf, Under 1 Year.

Toronto :

1st, J. & W. Russell, Richmond Hill, "Prince Royal," =14836=, red and white, calved Sept. 27th, 1890. Bred by exhibitors; sire, Windsor (imp.) =6456= (56771); dam, Roan Princess (imp.) =11075=, by Star of the West (48789), etc.

2nd, Thos. Russell, Exeter, "Merryman" =15201=, roan, calved Dec. 1st, 1890. Bred by exhibitor; sire, Riverside Hero =12013= ; dam, Medora 8th (imp.) =5174=, by Cabul (42860), etc.

3rd, John Miller & Sons, Brougham, "Bright Light"; red; calved Sept. 3rd, 1890; bred by John Russell, Brougham, Ont.; sire, Northern Light (57801); dam, Daisy Miller, by Crown Prince of Strathallan (43200).

4th, R. & S. Nicholson, Sylvan, "Brideman 16th"=14759=, roan, calved Sep. 9th, 1890. Bred by exhibitors; sire, Warrior (imp.) =4133= (55173); dam, Fifteenth Maid of Sylvan =15320=, by Warrior (imp.) =4133= (55173), etc.

5th, J. & W. B. Watt, Salem, "Enterprise," got by Young Abbotsburn =6236= ; dam, Roan Bessie, etc.

London :

1st, Thos. Russell, Exeter, "Merryman" =15199=. See above, Toronto.

2nd, R. & S. Nicholson, Sylvan.

3rd, John McEwan, Delaware.

Ottawa :

1st, W. C. Edwards & Co., Rockland, "Duke of Clarence" =14788=, red, calved July 23rd, 1891. Bred by exhibitors; got by Grandeur (imp.) = ; dam, Russell Rose =15416=, by Victor Royal (imp.) =2750=(52299), etc.

2nd, D. P. McPhail, Vernon.

Bull, Any Age.

Toronto :

R. & S. Nicholson, Sylvan, "Nonpareil Chief," =13669=. See above, Toronto.

London :

R. & S. Nicholson, Sylvan.

Ottawa :

Jas. Oke & Son, Alvinston, "Ironclad" =13347=. See above, Toronto.

Cow, 4 Years Old and Upwards.

Toronto :

1st, J. & W. B. Watt, Salem, "Mildred Third," =15022=, roan, calved June 15th, 1887. Bred by Jas. Redmond, Peterboro'; sire, Challenge =2933=; dam, Minnie *alias* Mildred (imp.) =5175=, by Gladstone (43286), etc.

2nd, J. & W. Russell, Richmond Hill, "Mina Lenton" =12534=, roan, calved Oct. 25th, 1885, Bred by J. Isaac, Markham; sire, Baron Lenton (imp.) =1222= (49081); dam, Mina of Aberdeen (imp.) =11058=, by Gladstone (43286), etc.

3rd, J. & W. Russell, Richmond Hill, "Roan Princess" (imp.) =11075=, roan, calved Feb. 26th, 1885, imported in 1887 by exhibitors. Bred by G. Inglis, Newmore, Invergorden, Scotland; sire, Star of the West (48789); dam, Vail Princess (Vol. 31, p. 472, E. H. B.), by Windsor Vail (44273), etc.

London :

1st, J. & W. B. Watt, Salem, "Mildred Third" =15022=, etc. See above, Toronto.

2nd, Thos. Russell, Exeter, "Barmpton's Kinellar" =13922=; roan, calved Aug. 24th, 1885. Bred by Benj. Hoggarth, Cromarty, Ont.; got by Golden Prince =3255=; dam, Barmpton Queen =2397=, by Royal Barmpton (imp.) =217= (45503), etc.

3rd, J. Crearer, Shakespeare, "Kerklevington Duchess 7th" =14917=, roan, calved March 15th, 1887. Bred by exhibitor; got by Laird of Kinellar =7246=; dam, Kerklevington Duchess =11971=, by Hiram =704=, etc.

Ottawa :

1st, W. C. Edwards & Co., Rockland, "Belinda" =14572=, roan, calved Nov. 29th, 1886. Bred by John Dryden, Brooklin, Ont.; got by Vensgarth (imp.) =1309= (47192); dam, Belle =2459=, by Royal Barmpton (imp.) =217= (45503), etc.

2nd, W. C. Edwards & Co., Rockland, "Twilight" (imp.) =11091=, roan, calved Dec. 16th, 1885. Bred by E. Cruickshank, Letherty, Aberdeenshire, Scotland, imported by John Dryden, Brooklin, Ont.; got by Perfection (37185); dam, Primrose (vol. 32), by Third Duke of Carolina (41364), etc.

3rd, Thorncliffe Stock Farm, Todmorden, "Adelina."

Cow, 3 Years Old.

Toronto :

1st, J. & W. B. Watt, Salem, "Rugby Vensgarth =15559=, dark red, calved Nov. 29th, 1887. Bred by Samuel Holman, Columbus, Ont.; sire, Vensgarth (imp.) =1309= (47192); dam, Florence Sixth =9152=, by Royal Barmpton (imp.) =217= (45503), etc.

2nd, H. & W. D. Smith, Hay, "Village Lily" =15641=, white, calved Jan. 29th, 1887. Bred by exhibitors; sire, Prince Albert =3669=; dam, Village Blossom (imp. in dam) =2277=, by Ben Wyvis (30528), etc.

3rd, J. & W. Russell, Richmond Hill, "Rosabell" =16022=, red, calved Nov. 5th, 1887. Bred by John Isaac, Markham; sire, Baron Lenton (imp.) =1222=; dam, Mina of Aberdeen (imp.) =11058=.

London :

1st, J. & W. B. Watt, Salem, "Rugby Vensgarth" =15559=. See above, Toronto.

2nd, H. & W. D. Smith, Hay, "Village Lady" =15641=. See above, Toronto.

3rd, J. Snell, Clinton, "Daisy 2nd" =16325=, roan, calved March 18th, 1888. Bred by H. Snell & Sons, Clinton; got by Vice Consul =8061=; dam, Daisy =8788=, by Captain Merlin =2923=, etc.

Ottawa :

1st, W. C. Edwards & Co., Todmorden, "Russell Rose" =15416=, roan, calved Feb. 5th, 1888. Bred by John Dryden, Brooklin, Ont.; got by Victor Royal (imp.) =2750= (52299); dam, Sweet Rose (imp.) =11090=, by Good Hope (44883), etc

2nd, Thorncliffe Stock Farm, Todmorden.
3rd, W. C. Edwards & Co., Rockland, "Bountiful," red and white, calved Oct. 21st, 1887. Bred by John Dryden, Brooklin, Ont. ; got by Vensgarth (imp.) =1309= (47192) ; dam, Bounce =15415= by Lord Glammis (imp.) =12682= (48192). etc.

Heifer, 2 Years Old.

Toronto :

1st, Thorncliffe Stock Farm, Todmorden, "Rose of Strathmore II." =17404= ; roan, calved Dec. 21st, 1889. Bred by J. Miller & Sons, Brougham, Ont. ; got by Vice-Council (imp.) =4132= (60112) ; dam, Rose of Strathmore =15735=, by Lavender Prince 2nd =5247=, etc.
2nd, J. & W. B. Watt, Salem, "Matchless Edith" =17088=, roan, calved October 12th, 1888. Bred by exhibitors ; sire, Barmpton Hero =324= ; dam, Matchless of Elmhurst 2nd, =3883=, by Baron Louan 3rd =338=, etc.
3rd, J. & W. Russell, Richmond Hill, "Nonpareil's Victoria =17139=, red, calved Sept. 7th, 1888. Bred by Arthur Johnston, Greenwood, Ont. ; sire, Vice-Consul =4142 ; dam, Nonpareil of Kinnellar (imp.) 8314 .

London :

1st, Thorncliffe Stock Farm, Todmorden, "Rose of Strathmore 2nd" =17404=. See above, Toronto.
2nd, J. & W. B. Watt, Salem, "Matchless 8th" 17088=. See above, Toronto.
3rd, T. Russell, Exeter, "Bracelet 5th" =18147=, red, calved Jan. 2nd, 1889. Bred by exhibitor ; got by Mariner (imp.) =2720= ; dam, Bracelet 2nd (imp.) =2115=, by Chevelier (41223), etc.

Ottawa :

1st, W. C. Edwards & Co., Rockland, "Bessie of Rockland" =16719=, roan, calved Nov. 29th, 1888. Bred by exhibitors ; got by Pioneer (imp.) 6411= ; dam, Louise of Rockland 15391=, by Prescott Boy =5660=, etc.
2nd, Thorncliffe Stock Farm, Todmorden, "Rose of Strathmore 2nd" =17404=. See above, Toronto.
3rd, W. C. Edwards & Co., Rockland, "Bertha of Rockland" =16718=, roan, calved Dec. 22nd, 1888. Bred by exhibitors ; got by Pioneer (imp.) =6411= ; dam, Sweet Rose (imp.) =11090=, by Good Hope =44883=, etc.

Heifer, 1 Year Old.

Toronto :

1st, J. & W. B. Watt, Salem, "Matchless 10th" ; got by Perfection =9100= ; dam, Matchless of Elmhurst 5th =3885=, by Baron Louan 3rd =338=, etc.
2nd, Thos. Russell, Exeter, "Jane Grey 2nd" =18149= ; dark roan, calved Nov. 10th, 1889. Bred by exhibitor ; got by Mariner (imp.) =2720= ; dam, Jane Gray =9327=, by Prince of Strathallan =3727=, etc.
3rd, H. & W. D. Smith, Hay, "Village Belle" = =, white, calved Sept. 30th, 1889. Bred by exhibitors ; sire, Prince Albert =3669 ; dam, Village Maid =14541=, by Earl of Mar =1248= (47815), etc.

London :

1st, J. & W. B. Watt, Salem, "Matchless 10th." See above, Toronto.
2nd, T. Russell, Exeter, "Jane Gray 2nd" =18149=. See above, Toronto.
3rd, H. & W. D. Smith. Hay, "Village Belle = =. See above, Toronto.

Ottawa :

1st, W. C. Edwards & Co., Rockland, "Barmpton Blossom"; dark brown, calved Nov. 24th, 1889. Bred by exhibitors ; got by Pioneer (imp.) =6411= ; dam, Belinda 14572 , by Vensgarth (imp.) =1309= (47192), etc.
2nd, Thorncliffe Stock Farm, Todmorden, "Nellie Bly."

Heifer Calf Under 1 Year.

Toronto :

1st, J. & W. Russell, Richmond Hill, "Centennial Isabella 25th" = =, roan, calved September 20th, 1890. Bred by exhibitors ; sire, Stanley *alias* Oliver Mowat =7949 ; dam, Isabella 8th =11882=, by Prince Royal =2288 , etc.
2nd, J. & W. B. Watt, Salem, "Kathleen" ; got by Musketeer =10740= ; dam, Irvine Belle 2nd 6354=, by Under Sheriff =1129=, etc.
3rd, John Miller, Markham, ; sire, Northern Light (imp.) =11111= (57801); dam, Rose Montrath 3rd 16346 , by Vice-Consul (imp.) 4132= (60112), etc.

London :

1st, J. & W. B. Watt, Salem, "Matchless 11th," by Barmpton Hero =324= ; dam, Matchless of Elmhurst 2nd =3883 , by Baron Louan 3rd =338=, etc.
2nd, H. & W. D. Smith, Hay, "Fragrance"; got by Prince Albert =3669 ; dam, Felspar =15638=, by Vocalist =9520 , etc.
3rd, J. & W. B. Watt, Salem, "Kathleen." See above, Toronto.

Ottawa :

1st, W. C. Edwards & Co., Rockland, "Rosewater" ; red white, calved Sept. 26th, 1890. Bred by exhibitors ; got by Pioneer (imp.) =6411= ; dam Sweet Rose (imp.) =11090=, by Good Hope 44883 , etc.

2nd, Thorncliffe Stock Farm, Todmorden, "Nellie Bly."
3rd, W. C. Edwards & Co., Rockland, "Bridesmaid"; roan, calved Sept. 30th, 1890. Bred by exhibitors; got by Pioneer (imp.)=6411=; dam, Belinda =14572=, by Vensgarth (imp.)=1309=(47192).

Four Calves Under 1 Year Bred and Owned by Exhibitor.

Toronto :

1st, J. & W. Russell, Richmond Hill.
2nd, J. & W. B. Watt, Salem.
3rd, H. & W. D. Smith, Hay.

London :

J. & W. B. Watt, Salem.

Herd Consisting of 1 Bull and 4 Females Over 1 Year, Owned by Exhibitor.

Toronto :

1st, J. & W. B. Watt, Salem.
2nd, J. & W. Russell, Richmond Hill.

London :

1st, J. & W. B. Watt, Salem.
2nd, T. Russell, Exeter.

Ottawa :

1st, W. C. Edwards & Co., Rockland.
2nd, Thorncliffe Stock Farm, Todmorden.

Female, Any Age.

Toronto :

J. & W. B. Watt, Salem, "Mildred 3rd" =15022=. See above.

Cow, Three Years Old which Makes the Most Butter in 2 Days.

London :

1st, T. Russell, Exeter, "Matilda 8th" =17179= ; red, calved March 20th, 1888. Bred by J. S. & P. C. Cameron, Brucefield, Ont.; got by 2nd Duke of Riverside =6922= ; dam, Matilda 4th =12454= by Prince of Orange =2268=, etc.
2nd, J. & W. B. Watt, Salem, "Mildred 3rd" =15022=. See above, Toronto.

HEREFORDS.

Bull, 3 Years Old and Upwards.

Toronto :

1st, H. D. Smith, Compton, Que., "Young Tushingham 2nd," 32398, calved March 26th, 1887. Bred by J. W. M. Vernon, Waterville; sire, Tushingham, 19450; dam, Formosa, 17th, 19465, by Bradwardine, 5246, etc.
2nd, F. A. Fleming, 15 Toronto St., Toronto, "Wilton Hillhurst, 35125, calved Feb. 19th, 1888. Bred by Hon. M. H. Cochrane, Hillhurst, Que.; sire, Ottoman, 29783; dam, Jessonda, 11357, by Cassio, 11353, etc.
3rd, F. A. Fleming, 15 Toronto St., Toronto, "Commodore" [102], calved March 11th, 1887. Bred by Hon. M. H. Cochrane, Hillhurst, Que.; sire, Cassio (imp.) 11353 (6849); dam, Constance, 11357, by Pirate, 7161, etc.

Ottawa :

1st, F. A. Fleming, 15 Toronto St., Toronto, "Commodore" [402.] See above, Toronto.
2nd, F. A. Fleming, 15 Toronto St., Toronto, "Wilton Hillhurst, 36125. See above, Toronto.
3rd, E. W. Judah, Hillhurst, Que.

Bull, 2 Years Old.

London :

1st, J. Baker, Littlewood, "Paul Wilton, 40788; sire, Grove Wilton, 28853; dam, Pauline, 21378, etc.

Bull, 1 Year Old.

Toronto :

1st, Dawes & Co., Lachine, Que., "Otto Wilton"; sire, Ottoman, 29783; dam, Jessando, 30311, by Marshall Grove, 16944, etc.

Bull Calf, Under 1 Year.

Toronto :

1st, F. A. Fleming, Toronto, "Baron Broady," vol. 12.
2nd, F. A. Fleming, Toronto, "Lillovet," vol. 12.
3rd, R. H. Pope, Cookshire, Que.

London :

1st, J. Baker, Littlewood, "Roger Wilton," 45088; sire, Paul Wilton, 40788; dam, Velvet 3rd, 31638 etc.

Ottawa

1st, F. A. Fleming, 15 Toronto St., Toronto, "Baron Broady," vol. 12.
2nd, E. W. Judah, Hillhurst, Que.

Bull, any Age.

Toronto :

H. D. Smith, Compton, Que., "Young Tushingham 2nd," 32398. See above, Toronto.

London :

J. Baker, Littlewood, "Paul Wilton," 40788.

Ottawa :

F. A. Fleming, 15 Toronto St., Toronto, "Commodore" [402]. See above, Toronto.

Cow, 4 Years old and Upwards.

Toronto :

1st, F. A. Fleming, 15 Toronto St. Toronto, "Lily Sixth" (imp.), 23833; calved April 6th, 1883, bred by A. Partridge, Discoyd, Eng.; sire, Delight, 23834; dam, Lily 2nd (21172), by Latitude, 21176, etc.
2nd, F. A. Fleming, 15 Toronto St, Toronto, "Miss Broady" (imp.) 23852; calved May 16th, 1882. Bred by A. R. Broughton, Knight Downton Castle, Eng.; sire, Downton Grand Duke (4182); dam, Broady 9th (23823), by Alphonso (9961), etc.
3rd, E. W. Judah, Hillhurst, Que., "Lowland Lass" 24758, calved May 25th, 1883. Bred by exhibitor; sire, King Pippin, 24212 (7063), dam, Stately 2nd, 24292, by Careful, 4594 (589)4, etc.

Ottawa :

1st, F. A. Fleming, 15 Toronto St., Toronto, "Lily Sixth" (imp.) 23833. See above, Toronto.
2nd, F. A. Fleming, 15 Toronto St., Toronto, "Miss Broady" (imp.) 23852. See above, Toronto.
3rd, E. W. Judah, Hillhurst, Quebec.

Cow, 3 Years Old.

Toronto :

1st, F. A. Fleming, 15 Toronto St., Toronto, "Lily Wilton," 36818, calved Feb. 13th, 1888; bred by exhibitor; sire, Conqueror 2nd, 19425; dam Lily 6th, 23833, by Delight, 23834, etc.
2nd, Dawes & Co., Lachine, Que., "Rosebud" 33334, calved December 3rd, 1887. Bred by exhibitors; sire, Barrister, 22645; dam, Cherry Bark, 22654, by Goldfinder, 6861, etc.
3rd, E. W. Judah, Hillhurst, Que., "Zita" 34235, calved Sept. 20th, 1887. Bred by exhibitor; sire, Duke of Chadnor, 23117; dam, Poppy, 24765, by King Pippin, 24212, etc.

Ottawa :

1st, F. A. Fleming, 15 Toronto St., Toronto, "Lily Wilton" 36818. See above, Toronto.
2nd, E. W. Judah, Hillhurst, Quebec

Heifer, 2 Years Old.

Toronto :

1st, F. A. Fleming, 15 Toronto St., Toronto, "Barbara Second" 36808, calved September 22nd, 1888. Bred by exhibitor; sire, Earl Downton, 12797; dam, Brady 9th, 23816, by Formosa Boy 5th, 14035, etc.
2nd, R. H. Pope, Cookshire, Quebec.
3rd, E. W. Judah, Hillhurst, Que., "Lowland Lady" 37990, calved September 24th, 1888. Bred by exhibitor; sire, Duke of Chadnor, 23117; dam, Hebe, 24288, by Auctioneer, 9572, etc.

Ottawa :

1st, E. W. Judah, Hillhurst, Quebec.
2nd, F. A. Fleming, 15 Toronto St., Toronto, "Barbara Second" 36808. See above, Toronto.

Heifer 1 Year Old.

Toronto :

1st, F. A. Fleming, 15 Toronto St., Toronto, "Miss Broady 4th."
2nd, F. A. Fleming, 15 Toronto St., Toronto, "Barbara III."
3rd F. A. Fleming, 15 Toronto St., Toronto, "Miss Rose."

Ottawa :

1st, F. A. Fleming, 15 Toronto St., Toronto, "Miss Broady 4th."
2nd, F. A. Fleming, 15 Toronto St., Toronto, "Barbara III."
3rd, F. A. Fleming, 15 Toronto St., Toronto, "Miss Rose."

HEIFER CALF, UNDER 1 YEAR.

Toronto :

1st, F. A. Fleming, 15 Toronto St., Toronto, "Playful 2nd" Vol. XI.
2nd, R. H. Pope, Cookshire, Quebec.
3rd, F. A. Fleming, 15 Toronto St., Toronto, "Lady Fenn 5th" Vol. XI.

Ottawa :

1st, F. A. Fleming, 15 Toronto St., Toronto, "Playful 2nd" Vol. XI.
2nd, F. A. Fleming, 15 Toronto St., Toronto, "Lady Fenn 5th" Vol. XI.
3rd, E. W. Judah, Hillhurst, Quebec.

HERD CONSISTING OF 1 BULL AND FOUR FEMALES OVER 1 YEAR OLD OWNED BY EXHIBITOR, TORONTO,

1st, F. A. Fleming, 15 Toronto St., Toronto.
2nd, F. A. Fleming, 15 Toronto St., Toronto.
3rd, H. D. Smith, Compton, Quebec.

Ottawa :

1st, F. A. Fleming, 15 Toronto St., Toronto.
2nd, F. A. Fleming, 15 Toronto St., Toronto.

FEMALE ANY AGE.

Toronto :

F. A. Fleming, 15 Toronto St., Toronto, "Lily 6th" 23833.

POLLED ANGUS.

BULL, 3 YEARS OLD AND UPWARDS.

Toronto :

1st, Robt. Craik, M.D., Lachine, Que., "Embyn" (6005) sire Royal George (4992), dam Edith of Ballindalloch (2673) etc.
2nd, R. H. Pope, Cookshire, Quebec.
3rd, Wm. Nesbitt, Colinville, "President of Bli Blo," (4871).

London :

1st, Wm. Nesbitt & Son, Colinville, "President of Bli Blo," (4871).

BULL 2 YEARS OLD AND UPWARDS.

Ottawa :

1st, Robt. Craik, M.D., Lachine, Que., "Embyn" (6005). See above, Toronto.

BULL, 2 YEARS OLD.

Toronto :

1st, Dawes & Co., Lachine, Que., "Baron Hillhurst," 12352; calved May 27th, 1889, bred by Hon. M. H. Cochrane, Hillhurst, Quebec, sire Lord Hillhurst, 3890, dam Blackbird of Hillhurst, 3976 by Young Hero, 1921 etc.

BULL, 1 YEAR OLD.

Toronto :

1st, Robt. Craik, M.D., Lachine, Que., "Faverly" (12901); sire, Charmer of Eastview, (8770), dam Ardgowan Favorite, (8087) etc.
2nd, Wm. Stewart & Son, Lucas, "Lord Forest" 13152.
3rd, Dawes & Co., Lachine, Que. "Siwash" 13851; calved September 8th, 1890, bred by exhibitors, sire, Charmer of Eastview, 8770; dam, Alice, 3993; by Shotto (3412) etc.

London :

1st, Wm. Stewart & Son, Lucas, "Lord Forest" 13152.

Ottawa :

1st, Robt. Craik, M.D., Lachine, Que., Faverly (12901). See above, Toronto.

BULL CALF, UNDER 1 YEAR.

Toronto :

1st, Wm. Stewart & Son, Lucas, "Theodore of Wilton Grove."
2nd, Robt. Craik, M.D., Lachine, Que., "Factor" 12899; sire, Favour (9770); dam, Fairy of Eastview, (7776) etc.
3rd, Wm. Stewart & Son, Lucas, "Munro of Wilton Grove" 13336.

London :

1st, Wm. Stewart & Son, Lucas, "Theodore of Wilton Grove."
2nd, Wm. Stewart & Son, Lucas, "Munro of Wilton Grove" 13336.

Ottawa :

1st, Robt. Craik, M.D., Lachine, Que., "Factor" 12899. See above, Toronto.

BULL, ANY AGE.

Toronto :

Wm. Stewart & Son, Lucas, "Lord Forest" 13152.

Ottawa :

Robt. Craik, M.D., Lachine, Que., "Embyn" (6005).

COW, 4 YEARS OLD AND UPWARDS.

Toronto :

1st, Robt. Craik, M.D., Lachine, Que., "Fairy A of Eastview, (7776); sire, Piper of Eastview, (5612); dam, Fairy of Eastview, (5577), etc.
2nd, Daives & Co., Lachine, Que., "Jeannie of Kinnochtie" (imp.) 5396 (8455); calved May 8th, 1883; bred by Thos. Ferguson, Kinnochty County Angus, Scotland; sire, Prince of the Realm, (1695); dam, Jeannie Patterson (6901), by A. R. H. B., (1576) etc.
3rd. Robt. Craik, M.D., Lachine, Que., "Ardgowan Favourite (8087); sire, Lord Napier of Ardgowan, (5514); dam, Fanny of Ardgowan, (6512), etc.

3 YEARS OLD AND UPWARDS.

London :

1st, Wm. Stewart & Son, Lucas, "Tibby 5th (17241).
2nd, Wm. Stewart & Son, Lucas, "Mayflower 3rd, 6882.

COW, 3 YEARS OLD AND UPWARDS.

Ottawa :

1st, Robt. Craik, M.D., Lachine, Que., "Fairy A of Eastview" 7776. See above, Toronto.
2nd, Robt. Craik, M.D., Lachine, Que., "Ardgowan Favourite, (8087). See above, Toronto.
3rd, Robt. Craik, M.D., Lachine, Que, "Fanny of Ardgowan (6512); sire, Prince Leopold of Kinochtry (2297); dam, Favourite 11th, (4337) etc.

COW, 3 YEARS OLD.

Toronto :

1st, Wm. Stewrart & Son, Lucas, "Thistle of Keiller" (vol. 16).
2nd, R. H. Pope, Cookshire, Quebec.

HEIFER, 2 YEARS OLD.

Toronto :

1st, R. H. Pope, Cookshire, Que.
2nd, Robt. Craik, M.D., Lachine, Que., "Black Jade" (15038); sire, Royal George (4992); dam, Black Jewel (11202), etc.
3rd, Wm. Stewart & Son, Lucas, "Topsy of Killor" (Vol. 16).

London :

1st, Wm. Stewart & Son, Lucas, "Topsy of Killor" (Vol. 16).

Ottawa :

1st, Robt. Craik, M.D., Lachine, Que., "Black Jade" (15038). See above, Toronto.

HEIFER, 1 YEAR OLD.

Toronto :

1st, R. H. Pope, Cookshire, Que.
2nd, Robt. Craik, M.D., Lachine, Que., "Fay" (12904); sire, Charmer of Eastview (8770); dam, Fairy A of Eastview (7776), etc.

Ottawa :

1st, Robt. Craik, M.D., Lachine, Que., "Fay" (12904). See above, Toronto.

HEIFER CALF UNDER 1 YEAR.

Toronto :

1st, Robt. Craik, M.D., Lachine, Que., "Ericacea" (15191); sire, Knight of the Prides (6161); dam, Emetine (15186), etc.
2nd, R. H. Pope, Cookshire, Que.
3rd, Dawes & Co., Lachine, Que., "Regina of Lachine," 13853; calved Oct. 30th, 1890; bred by exhibitors; sire, Charmer of Eastview, 8770; dam, Magpie of Kinkton, by Eurymedon (2089), etc.

Ottawa:

1st, Robt. Craik, M.D., Lachine, Que., "Ericacea" (15191). See above, Toronto.
2nd, Robt. Craik, M.D., Lachine, Que.

HERD CONSISTING OF ONE BULL AND FOUR FEMALES OVER 1 YEAR OLD, OWNED BY EXHIBITOR.

Toronto:

1st, Robt. Craik, M.D., Lachine, Que
2nd, R. H. Pope, Cookshire, Que.
3rd, Wm. Stewart & Son, Lucas.

London:

Wm. Stewart & Son, Lucas.

Ottawa:

Robt. Craik, M.D., Lachine, Que.

FEMALE ANY AGE.

Toronto:

Robt. Craik, M.D., Lachine, Que., "Fairy A of Eastview" (7776).

London:

Wm. Stewart & Son, Lucas, "Topsy" (Vol. 16).

GALLOWAYS.

BULL 3 YEARS OLD AND UPWARDS.

Toronto:

1st, Wm. Kough, Owen Sound, "Claverhouse" (imp.) (4250) 4614; sire, Crusader (2858); dam, Topsy (4146).
2nd, D. McCrae, Guelph, "Stanley II" O. E. F. (imp.) (4473) 2827; sire, Stanley III (1793); dam, Bertha of Drumlanrig (4222).
3rd, D. McCrae, Guelph, "Count Palatine" (imp.) (4508) 5883; sire, Crusader (2858); dam, Cantatrice (5569).

London:

1st, D. McCrae, Guelph, "Canadian Borderer," 5945.
2nd, D. McCrae, Guelph, "The Cob of Tarbroech," 5727.

BULL 2 YEARS OLD AND UPWARDS.

Ottawa:

1st, Wm. Kough, Owen Sound, "Claverhouse" (imp.) (4250) 4614. See above, Toronto.
2nd, Wm. Kough, Owen Sound, "Marseilles," 6120; calved June 2nd, 1889; bred by exhibitor; sire, Claverhouse (imp.) 4614, (4250); dam, Miss Steele 2nd, 3452, by Creochs, 673, etc.

BULL 2 YEARS OLD.

Toronto:

1st, Wm. Kough, Owen Sound, "Marseilles," 6120; sire, Claverhouse (imp.) (4240) 4614; dam, Miss Steele 2nd, 3452.
2nd, D. McCrae, Guelph, "Norfolk," 6764; sire, Black Ronald (4326); dam, Nettie of Chapel-hill (8840), etc.

London:

1st, D. McCrae, Guelph, "Squire Porter," 6765.
2nd, D. McCrae, Guelph, "Norfolk,' 6764. See above, Toronto.

BULL 1 YEAR OLD.

Toronto:

1st, Wm. Kough, Owen Sound, "Guy of Claverhouse," 6638; sire, Claverhouse, 4614 (4250); dam, Countess of Glencairn (9501).
2nd, D. McCrae, Guelph, "Laird Badger"; sire Chester, 4472; dam, Fanny of Lairdlough, 100[illegible]

London:

1st, D. McCrae, Guelph. "Viscount Stanley," 8533.

Ottawa:

1st, Wm. Kough, Owen Sound, "Guy of Claverhouse," 6638. See above, Toronto.

Bull Calf under 1 Year.

Toronto:

1st, W. Kough, Owen Sound, "Glencairn," 8175 ; sire, Marseilles, 6120 ; dam, Countess of Glencairn 3rd, 6116.

2nd, Wm. Kough, Owen Sound, "Pathfinder of Claverhouse," 7984 ; sire, Claverhouse, 4614 (4250) dam, Agnes of Egremont, 777.
3rd, D. McCrae, Guelph, "Hastings" ; sire, Chester, 4472 ; dam, Hannah 3rd, 7699.

London :

1st, D. McCrae, Guelph, "Russell," 8534.
2nd, D. McCrae, Guelph, "Marathon," 8519.

Ottawa :

1st, Wm. Kough, Owen Sound, "Glencairn," 8175. See above, Toronto.
2nd, Wm. Kough, Owen Sound, "Pathfinder of Claverhouse," 7984. See above, Toronto.

Bull any age.

Toronto:

W. Kough, Owen Sound, "Claverhouse" (imp.) 4614 (4250).

London :

D. McCrae, Guelph, "Canadian Borderer," 5945.

Ottawa :

W. Kough, Owen Sound, "Claverhouse" (imp.) 4614 (4250).

Cow, 4 Years old and upwards.

Toronto :

1st, Wm. Kough, Owen Sound, "Countess of Glencairn" (imp.) 4617 (9501); sire, Rover of Newtonairds, 2742 ; dam, Bertha of Newtonairds, 9514.
2nd, D. McCrae, Guelph, "Good Girl," 7431 ; sire, Baliol, 1475 ; dam, Eva of Erlieston, 2844.
3rd, D. McCrae, Guelph, "Sally of Peninghame," 940 ; sire, Gloucester, 2680 ; dam, Elora 4th, 5032.

Cow, 3 Years old and upwards.

London :

1st, D. McCrae, Guelph, "Hannah A of Guelph," 4622.
2nd, D. McCrae, Guelph, "Lizzie VII of Tarbroech," 5730.

Ottawa :

1st, Wm. Kough, Owen Sound, "Countess of Glencairn" (imp.) 4617, (9501). See above, Toronto.
2nd, Wm. Kough, Owen Sound, "Miss Steele 5th," 4248 ; calved Sept. 19th, 1887 ; sire, Creochs, 673 ; dam, Miss Steele 2nd, 3452, by Creochs, 673, etc.
3rd, Wm. Kough, Owen Sound, "Countess of Galloway 2nd" (imp.) 4618, (10089) ; calved Feb. 23rd, 1886 ; sire, Robin Gray (2950) ; dam, Countess of Galloway (9480), etc.

Cow, 3 Years old.

Toronto :

1st, Wm. Kough, Owen Sound, "Miss Steele 5th," 4248; sire, Creochs, 673 ; dam, Miss Steele 2nd, 3452.
2nd, D. McCrae, Guelph, "Queenie of Guelph," 5736 ; sire, The Cub, 4167 : dam, Idle Queen, 10507.
3rd, D. McCrae, Guelph, "Guelph Columbine" ; sire, Current Coin, 4037 ; dam, Netty, 8840.

Heifer, 2 Years Old.

Toronto :

1st, Wm. Kough, Owen Sound, "Countess of Glencairn 3rd," 6116 ; sire, Claverhouse, 4614 (4520) ; dam, Countess of Glencairn, 4617 (9501).
2nd, D. McCrae, Guelph, "Ranee Ninth," 5937 ; sire, Black Crusader, 4504 ; dam, Ranee 4th, 5541.
3rd, D. McCrae, Guelph, "Chummie," 5938 ; sire, Stanley 2nd, O.E.F., 4473 ; dam, Chrissy, 7099.

London :

1st, D. McCrae, Guelph, "Susie III. of Janefield," 6769.
2nd, D. McCrae, Guelph, "Fairy Knelle," 5939.

Ottawa :

1st, Wm. Kough, Owen Sound, "Countess of Glencairn 3rd," 6116. See above, Toronto.

Heifer, 1 Year Old.

Toronto :

1st, D. McCrae, Guelph, "Semiramis A.;" sire, Chester, 4472 ; dam, Semiramis 19th, 9609.
2nd, W. Kough, Owen Sound, "Duchess Louise Fourth," 6585 ; sire, Claverhouse, 4614 (4250) ; dam, Duchess Louise 2nd, 2830.

3rd, W. Kough, Owen Sound, "Countess Galloway Third," 6413 ; sire, Claverhouse, 4614 (4250) ; dam, Countess Galloway 2nd, 4618 (10089).

London :

1st, D. McCrae, Guelph, "Hannah C. of Guelph," 6775.
2nd, D. McCrae, Guelph, "Lady Gladys," 7377.

Ottawa :

1st, Wm. Kough, Owen Sound, "Agnes K. 3rd," 6586 ; calved November 17th, 1889 ; sire, Claverhouse (imp.) 4614 (4250) ; dam, Agnes of Egremont, 777, by Lord Chelmsford, 521, etc.
2nd, Wm. Kough, Owen Sound, Mary 6th, 6415 ; calved October 4th, 1889 ; sire, Claverhouse (imp.) 4614 (4250) ; dam, Mary, 3291, by Lord Chelmsford, 521, etc.
3rd, Wm. Kough, Owen Sound, "Duchess Louise K. 5th," 7551 : calved October 1st, 1890 ; sire, Claverhouse (imp.) 4614 (4250) ; dam, Duchess Louise 2nd, 2830, by Closeburn, 674, etc.

Heifer Calf, under 1 Year.

Toronto :

1st, W. Kough, Owen Sound, "Countess Galloway K. Fourth," 7549 ; sire, Claverhouse, 4614 (4250) ; dam, Countess Galloway, 4168 (10080).
2nd, D. McCrae, Guelph, "Dora Eleventh ;" sire, Chester (4472) ; dam, Dora 7th, 9043.
3rd, "Countess Glencairn K. Fourth," 7987 ; sire, Claverhouse, 4614 (4250) ; dam, Countess Glencairn, 4617 (9501).

London :

1st, D. McCrae, Guelph, "Maruta," 8513.
2nd, D. McCrae, Guelph, "Helenogg," 8511.

Ottawa :

1st, Wm. Kough, Owen Sound, "Countess of Glencairn K. 4th," 7987. See above, Toronto.
2nd, Wm. Kough, Owen Sound, "Countess of Galloway K. 4th," 7549. See above, Toronto.
3rd, Wm. Kough, Owen Sound, "Duchess Louise K. 5th," 7551 ; calved October 1st, 1890 ; sire, Clavenhouse (imp.) 4614 (4250) ; dam, Duchess Louise 2nd, 2380, by Closeburn (674), etc.

Herd consisting of One Bull and Four Females over 1 Year Old, owned by Exhibitor.

Toronto :

1st, W. Kough, Owen Sound.
2nd, D. McCrae, Guelph.

London :

1st, D. McCrae, Guelph

Ottawa :

Wm. Kough, Owen Sound.

Female, any Age.

Toronto :

Wm. Kough, Owen Sound, "Countess of Glencairn 3rd," 6116.

London :

D. McCrae, Guelph, "Hannah A. of Guelph."

DEVONS.

Bull, 3 Years Old and Upwards.

Toronto :

1st, W. J. Rudd, Eden Mills, "Young Ensign" [925] ; calved April 4th, 1884 ; bred by Robert Oliver, Priceville ; sire, Red Tom [831] ; dam, Isabella [656], by Hartland [363], etc.

Ottawa :

1st, W. J. Rudd, Eden Mills, "Young Ensign" [925]. See above, Toronto.
2nd, Chas. Mohr, Mohr's Corners.

Bull, 2 Years Old.

Toronto :

1st, W. J. Rudd, Eden Mills, "Captain" [984] ; calved March 10th, 1889 ; bred by exhibitor ; sire, Lansdowne [933] ; dam, Lady Creamer [929], by Marquis 2nd [871], etc.

Ottawa :

1st, W. J. Rudd, Eden Mills, "Captain" [984]. See above, Toronto.

BULL, 1 YEAR OLD.

Ottawa :

1st, W. J. Rudd, Eden Mills, "Ben" [997]; calved February 18th, 1891; bred by exhibitor; sire, Young Ensign [925]; dam, Flower of the Flock, [889], by Curly Tom [886], etc.

BULL CALF, UNDER 1 YEAR.

Toronto :

1st, W. J. Rudd, Eden Mills, "Billy" [998]; calved February 20th, 1891; bred by exhibitor; sire, Hero [982]; dam, Lady Creamer [929], by Marquis 2nd [871], etc.

2nd, W. J. Rudd, Eden Mills, "Abe" [999]; calved April 24th, 1891; bred by exhibitor; sire, Young Ensign [925]; dam, Dido [951], by Victor, [884], etc.

Ottawa :

1st, W. J. Rudd, Eden Mills, "Abe" [999]. See above, Toronto.

BULL, ANY AGE.

Toronto :

W. J. Rudd, Eden Mills, "Young Ensign" [925].

Ottawa :

W. J. Rudd, Eden Mills, "Young Ensign" [925].

COW, 4 YEARS OLD AND UPWARDS.

Toronto :

1st, W. J. Rudd, Eden Mills, "Lady Graceful" [946]; calved January 8th, 1886; bred by exhibitor; sire, Rose's Duke (imp.) [929]; dam, Red Rose [890], by Professor [847], etc.

2nd, W. J. Rudd, Eden Mills, "Dido" [951]; calved May 20th, 1887; bred by exhibitor; sir, Victor [884]; dam, Beauty [800], by Kempenfeldt [719], etc.

3rd, W. J. Rudd, Eden Mills, "Charlotte" [954]; calved October 14th, 1884; bred by Wm. Courtice, Courtice; sire, Curly Tom [886]; dam, Queen 2nd [788], by Gladstone [391], etc.

Ottawa :

1st, W. J. Rudd, Eden Mills, "Lady Graceful [946]. See above, Toronto.

COW, 3 YEARS OLD.

Toronto :

1st, W. J. Rudd, Eden Mills, "Frances" [962]; calved March 10th, 1888; bred by exhibitor; sire Lord Lansdowne [933]; dam, Red Rose [890], by Professor [847], etc.

Ottawa :

1st, W. J. Rudd, Eden Mills, "Frances" [962]. See above, Toronto.

HEIFER, 2 YEARS OLD.

Toronto :

1st, W. J. Rudd, Eden Mills, "Fanny" [985]; calved May 20th, 1889; bred by exhibitor; sire, Lord Lansdowne [933]; dam, Rose [953], by Sir John A. [852], etc.

2nd, W. J. Rudd, Eden Mills, "Gem" [986]; calved January 15th, 1889; bred by exhibitor; sire, Lord Lansdowne [933]; dam, Charlotte [954], by Curly Tom [886], etc.

Ottawa :

1st, W. J. Rudd, Eden Mills, "Fanny" [985]. See above, Toronto.
2nd, W. J. Rudd, Eden Mills, "Gem" [986]. See above, Toronto.
3rd, Chas. Mohr, Mohr's Corners.

HEIFER, 1 YEAR OLD.

Toronto :

1st, W. J. Rudd, Eden Mills, "Roda" [1011]: calved May 7th, 1890; bred by Exhibitor; sire, Duke [947]; dam, Rose [953], by John A. [843], etc.

2nd, W. J. Rudd, Eden Mills, "Beauty."

3rd, W. J. Rudd, Eden Mills, "Twilight" [1012]; calved April 25th, 1890; bred by Exhibitor; sire, Duke [947]; dam, Charlotte, [954], by Curly Tom [886], etc.

Ottawa :

1st, W. J. Rudd, Eden Mills, "Roda" [1014]. See above, Toronto.

HEIFER CALF, UNDER 1 YEAR.

Toronto :

1st, W. J. Rudd, Eden Mills, "Ruby" [1018]; calved March 16th, 1891; bred by exhibitor; sire, Young Ensign [925]; dam, Lady Graceful [946], by Rose's Duke (imp.) [929], etc.

2nd, W. J. Rudd, Eden Mills, "Pansy" [1016]; calved May 5th, 1891; bred by exhibitor: sire, Young Ensign [925]; dam, Charlotte [954], by Curly Tom [886], etc.

Ottawa :

1st, W. J. Rudd, Eden Mills, "Ruby" [1018]. See above, Toronto.
2nd, W. J. Rudd, Eden Mills, "Pansy" [1016]. See above, Toronto.
3rd, Chas. Mohr, Mohr's Corners.

Herd, consisting of One Bull and Four Females over 1 Year, Owned by Exhibitor.

Toronto :

1st, W. J, Rudd, Eden Mills.
2nd, W. J. Rudd, Eden Mills.

Ottawa :

W. J. Rudd, Eden Mills.

Female, any Age.

Toronto :

W. J. Rudd, Eden Mills, "Frances" [962].

AYRSHIRES.

Bull, 3 Years old and upwards.

Toronto :

1st, Jas. McCormick, Rockton, "Campbell O.E.F."—357—; red and white; calved June 5th, 1885 ; bred by the Ontario Agricultural College, Guelph ; sire, Campbell of Drumlanrig (imp.)—39—; dam, Stately 3rd of Drumlanrig (imp.) —74—, by Knight of Drumlanrig (35), etc.
2nd, T. Guy, Oshawa, "Butterfly Duke"—501—; red and white ; calved April 2nd, 1888 ; bred by exhibitor : sire, Butterfly of Oshawa —352—; dam, Perfection —181—, by Eclipse —105—, etc.
3rd, D. Morton & Sons, Hamilton, "Royal Chief" (imp.) —75—; white and brown; calved April, 1887; imported in 1889 ; bred by Arch. Mair, of Crofthead, Tarbolton, Scotland ; sire, Douglas of Crofthead (1337); dam, Marion of Crofthead (4887), by Boulder of Crofthead (1315), etc.

London :

1st, D. Morton & Sons, Hamilton, "Royal Chief" (imp.)—75—; see above, Toronto.

Ottawa :

1st, Jas. Drummond, Petite Cote, Que., "Rob Roy of Parkhill"—876—; dark red and white ; calved Jan. 4th, 1886 ; bred by exhibitor ; sire, Promotion (imp.)—81—; dam, Viola III. (imp.)—1612—, by Gallant Graham, etc.
2nd, W. M. & J. C. Smith, Fairfield Plains, "Rob Roy of Oxford"—300—; brown and white ; calved March 1st, 1881 ; bred by Jos. Yuill, Carleton Place, Ont. ; sire, Arthur Mars—109—; dam, Fancy —523—, by Canada—153—, etc.
3rd, Jos. Yuill, Carleton Place.

Bull, 2 Years old.

Toronto :

1st, Kains Bros., Byron, "Prince of Byron"—583—; red and white ; calved Sept. 20th, 1888 ; bred by exhibitors ; sire, Stonecalsay (imp.)—34—; dam, Victoria of Byron—484—, by Lord Primrose —269—, etc.
2nd, W. M. & J. C. Smith, Fairfield Plains, "Burford"—585—; red and white ; bred by exhibitors ; sire, Rob Roy of Oxford—300—; dam, Gurta 9th—840—, by Stonecalsay 3rd —431—, etc.
3rd, T. Guy, Oshawa, "Baron of Park Hill—977—; dark red and white ; calved Aug. 16th, 1889 ; bred by Jas. Drummond, Petite Cote, Montreal, Que.; sire, Rob Roy of Parkhill—876—; dam, Lillie of Hardiston (imp.)—1642—, by Young Baron, etc.

London :

1st, Kains Bros., Byron, "Prince of Byron"—583—; see above, Toronto.
2nd, M. Ballantyne, St. Marys, "Harry Lee"—580—; red ; calved Feb. 10th, 1889 ; bred by exhibitor; sire, Lorne of the Lee—579—; dam, Dandy—921—, by Stonecalsay IV.—255—, etc.

Ottawa :

1st, W. M. & J. C. Smith, Fairfield Plains, "Burford"—588—; red and white ; calved Jan. 13th, 1889 ; bred by exhibitors ; sire, Rob Roy of Oxford—300; dam, Gurta IX—840—, by Stonecalsay III —431—, etc.
2nd, W. C. Edwards & Co., Rockland, "Emperor of Dromore" (imp.)—814—; red and white ; calved March, 1889 ; bred by Matthew Templeton, Dromore, Scotland ; sire, Stirling Castle of Dromore (988); dam, Mary I of Dromore (3193).

BULL, 1 YEAR OLD.

Toronto :

1st, T. Guy, Oshawa, "White Prince"—922—; white, with red spots; calved Feb. 20th, 1890; bred by exhibitor; sire, Butterfly of Oshawa—352—; dam, Model—403—, by Bismarck—119—, etc.

2nd, W. M. & J. C. Smith, Fairfield Plains, "Hamilton Chief"—875—; red and white; calved April 18th, 1890; bred by David Morton & Sons, Hamilton, Ont.; sire, Royal Chief (imp.)—75—; dam, Judy (imp.)—1206—, by Red Prince (1000), etc.

3rd, W. Stewart, Jr., Menie, "Dainty Davie 901—; white and red; calved May 3rd, 1890; bred by D. Morton & Sons, Hamilton, Ont.; sire, Royal Chief (imp.)—75—; dam, Primrose (imp.)—1205—, by Prince Charlie of Dunlop (959), etc.

London :

1st, M. Ballantyne, St. Marys, "Allan Lee"—897—; white and red; calved Feb. 25th, 1890: bred by exhibitor; sire, Lorne of the Lee—579—; dam, Dandy—921—, by Stoncalsay IV—255—, etc.

2nd, Kains Bros., Byron, "Castle Douglas" (imp.)—1126—; brown and white; calved June 10th, 1890; bred by Andrew Mitchell, Barcheskie, Scotland; imported in dam by Thos. Brown, Petite Cote, Que.; sire, Traveller (1441); dam, Queen of Dunlop (3830), etc.

Ottawa :

1st, Jas. Drummond, Petite Cote, Que., "Victor of Park Hill" 5121; sire, Rob Roy of Park Hill —876—; dam, Victoria 2931, by Lorne 2227, etc.

2nd, W. M. & J. C. Smith, Fairfield Plains, "Hamilton Chief"—875—. See above, Toronto.

3rd, W. C. Edwards & Co., Rockland, "Cyclone" (imp.)—813—; white and little red; calved May 15th, 1890; bred by And. Mitchell, Barcheskie, Kirkcudbright, Scotland; imported in dam by exhibitors; sire, Justice of Barcheskie (5332); dam, Lindsay V of Barcheskie (imp.)—1646—(5536), by Knowsley (325).

BULL CALF, UNDER 1 YEAR.

Toronto :

1st, Jos. Yuill, Carleton Place, "Benwell"—1173—; dark red and white; calved December 23rd, 1890; bred by exhibitor; sire, Jock—344—; dam, Mabel of Meadowside—1480—, by Rob Roy of Oxford —300—, etc.

2nd, Kains Bros., Byron, "Dugal"—1195—; red and white; calved Aug. 20th, 1890; bred by exhibitors; sire, Earl of Fife—584—; dam, Dolly of Byron—1086—, by Watty Mars—268—, etc.

3rd, T. Guy, Oshawa, "Traveller"—923—; white and red; calved November 15th, 1890; bred by exhibitor; sire, Butterfly Duke—501—; dam, Idalia 3rd—1781—, by Butterfly of Oshawa—352—, etc.

London :

1st, Kains Bros., Byron, "Middlesex"—1216—; red and white; calved Sept. 10th, 1890; bred by exhibitors; sire, Prince of Byron—583—; dam, Jeanie of Auchenbrain (imp.)—129—, by Duke 3rd (647).

2nd, D. Morton & Sons, Hamilton, "Heather Jock"— —; calved May 24th, 1891; bred by exhibitors; sire, Royal Chief (imp.)—75—; dam, Primrose (imp.)—1205—, by Prince Charlie of Dunlop (959), etc.

Ottawa :

1st, Thos. Brown, Petite Cote, Que., "Silver King" (imp.) 5809; sire, Traveller (1441); dam, Nellie Osborne (imp.) 5358, etc.

2nd, Jos. Yuill, Carleton Place.

3rd, Robt. Reid, Hintonburg, "Sultan" 2nd.

BULL, ANY AGE.

Toronto :

Kains Bros., Byron, "Prince of Byron"—583—.

London :

D. Morton & Sons, Hamilton, "Royal Chief" (imp.)—75—.

Ottawa :

Jas. Drummond, Petite Cote, Que., "Rob Roy of Park Hill"—876—.

COW, 4 YEARS OLD AND UPWARDS.

Toronto :

1st, D. Morton & Sons, Hamilton, "Maggie Brown of Barmoorhill" (imp.)—1204—(5099); brown; calved Feb., 1886; imported 1888; bred by David Gray, Barmoorhill, Tarbolton, Scotland; sire, Baldy (1315); dam, Maggie (1267).

2nd, W. M. & J. C. Smith, Fairfield Plains, "Empress"—599—; red and white; calved October 21st, 1882; bred by Thos. Guy, Oshawa, Ont.; sire, William Wallace—130—; dam, Queen—598—, by Clansman—327—, etc.

3rd, D. Morton & Sons, Hamilton, "Dandy First" (imp.)—1208—(5502); brown and white; calved March, 1886; imported in 1888; bred by Hugh Jack, Little Shewalton, Irvine, Scotland; sire, Red Prince (1000); dam, Dandy of Shewalton (2688).

Cow, 3 Years Old and upwards.

London :

1st, Kains Bros., Byron, "Jeanie of Auchenbrain (imp.)—129—; red and white; calved April, 1882; bred by Robt. Wallace, Auchenbrain, Mauchlin, Scotland; imported in 1884 by O. E. F., Guelph, Ont.; sire, Duke III (647); dam, Paisley by Wallace of Drumlanrig (61), etc.

2nd, D. Morton & Sons, Byron, "Dandy First" (imp.)—1208—(5502); see above, Toronto.

Ottawa :

1st, Jas. Drummond, Petite Cote, Que., "Viola III" (imp.)—1612—; red and white; calved 1882; bred by Chas. Kay, Mill Farm, Gargnnock, Scotland; imported by exhibitor; sire, Gallant Graham; dam, Violet II of Mill Farm, etc.

2nd, Thos. Brown, Petite Cote, Que., "Annie of Barcheskie (imp.) 5357.

3rd, W. M. & J. C. Smith, Fairfield Plains, "Gurta XII"—602—; dark red and white; calved Sept. 25th, 1886; bred by exhibitor; sire, Jock—344—; dam, Gurta VI—597—, by William Wallace —130—, etc.

Cow, 3 Years Old.

Toronto :

1st, J. McCormick, Rockton, "Phyllis of Rockton"—1109—; white and red; calved Feb. 12th, 1888; bred by exhibitor; sire, Hero of Rockton—220—; dam, Milkmaid—296—, by Seafield 2nd—106—, etc.

2nd, T. Guy, Oshawa, "Model Fourth—911—; red and white; calved Jan. 6th, 1888; bred by exhibitor; sire. Butterfly of Oshawa—352—; dam, Model—403—, by Bismarck—119—, etc.

3rd, Wm. Stewart, Jr., Menie, "Alice Milne"—1918—; white and red; calved May 25th, 1887; bred by A. Milne, Menie, Ont.; sire, Gen. Middleton—443—; dam, Snowdrop—587—, by Rob Roy III—264—, etc.

Ottawa :

1st, Thos. Brown, Petite Cote, Que., "Brownie 6th of Barcheskie" (imp.) 5359.

2nd, Jas. Drummond, Petite Cote, Que., "Primrose of Park Hill" 4543; red, with small white spots; calved Sept. 23rd, 1887; bred by exhibitor; sire, Promotion (imp.)—81—; dam, Juno—294—, by Duke of Athol (imp.)—30—, etc.

3rd, W. M. & J. C. Smith, Fairfield Plains, "Gurta XIV"—886—; red and white; calved Oct. 11th, 1887; bred by exhibitors; sire, Jock—344—; dam, Gurta IX—840, by Stoncalsay III—431—, etc

Heifer, 2 Years Old.

Toronto :

1st, W. M. & J. C. Smith, Fairfield Plains, "Alma"—1196—; light red and white; calved Oct. 18th, 1888; bred by exhibitor; sire, Rob Roy of Oxford—300—; dam, Ada—882—, by Jock—344—, etc.

2nd, D. Morton & Sons, Hamilton, "Dandy Second" (imp.)—2004—; brown and white; calved April 6th, 1889; bred by Hugh Jack, Little Shewalton, Irvine, Scotland; sire, Dandy Jim (1579); dam, Dandy 1st (imp.)—1208—(5502), by Red Prince (1000), etc.

3rd, T. Guy, Oshawa, "Dolly"—1788—; red and white; calved April 10th, 1889; bred by exhibitor; sire, Butterfly of Oshawa—352—; dam, Dolly—760—, by Sir Garnet—212—, etc

London :

1st, Kains Bros., Byron, "Lorna"—1845—; red and white; calved May 7th, 1889; bred by exhibitors; sire, Stonecalsay (imp.)—34—; dam, Dolly of Byron—1086—, by Watty Mars—268—, etc.

2nd, Kains Bros., Byron, "Jeanie"—1843—; red and white; calved Sept. 8th, 1888; bred by exhibitors; sire, Stonecalsy (imp.)—34—; dam, Lucy of Byron—1080—. by Watty Mars—268—, etc.

Ottawa :

1st, Jas. Drummond, Petite Cote, Que., "Kate of Park Hill" 5005; sire, Rob Roy of Park Hill—876—dam, Ida 1181, etc.

2nd, W. C. Edwards & Co., Rockland, "Rosa Bella"—1322—; red and white; calved April 8th, 1889 bred by exhibitors; sire, Promotion (imp.)—81—; dam, Elsie II—1299—, by Roger III—609—, etc.

Heifer, 1 Year Old.

Toronto :

1st, T. Guy, Oshawa, "Ida Third"—1785—; red and little white; calved Aug. 25th, 1890; bred by exhibitor; sire, Butterfly of Oshawa—352—; dam, Ida—845—, by Lord Lorne—307—, etc.

2nd, Jas. McCormick, Rockton, "Flora Campbell"—1760—; red and white; calved Oct. 28th, 1889; bred by exhibitor; sire, Campbell, O. E. F. 356—; dam, Spotty of Rockton—423—, by Crown Prince—221—, etc.

3rd, Jos. Yuill, Carleton Place, "Perfection of Meadowside"—1774—; red and white; calved Jan. 6th, 1890; bred by exhibitor; sire, Jock—314—; dam, Lily of Meadowside—1737, by Rob Roy of Oxford —300—, etc.

London :

1st, D. Morton & Sons, Hamilton, "Sprightly 3rd—1859—; calved March 19th, 1890; bred by exhibitors; sire, Royal Chief (imp.)—75—; dam, Sprightly (imp.)—1210—, by Auchendenan (1), etc.

2nd, M. Ballantyne, St. Marys, "Kitty Lee"—1563—; red and white; calved Feb. 15th, 1890; bred by exhibitor; sire, Lorne of the Lee—575—; dam, Adela—920—, by William Wallace—130—, etc.

Ottawa :

1st, James Drummond, Petite Cote, Que., "Medora III of Park Hill"; sire, Rob Roy of Park Hill —876—; dam, Medora II 3635, by Promotion (imp.)—81—, etc.
2nd, W. C. Edwards & Co., Rockland. "Edmointa 5328.
3rd, Thos. Brown, Petite Cote, Que., "Mysie Carrick 5364 ; sire, Robby Dick 5363 ; dam, Dolly (imp.) 3224, etc.

Heifer Calf, Under 1 Year.

Toronto :

1st, Kains Bros., Byron, "Mono"—1846—; red and white ; calved May 24th, 1891 ; bred by exhibitors ; sire, Earl of Fife—584—; dam, Flossy—1193—, by Stoncalsay (imp.)—34—, etc.
2nd, W. Stewart, Jr., Menie, "Ayrshire Queen"—1919—; red and white ; calved June 15th, 1891 ; bred by exhibitor ; sire, White Prince II (imp.)—866—; dam, Pride of Menie Stock Yards—1182—, by Gen. Middleton—443—, etc.
3rd, T. Guy, Oshawa, "Oshawa Lass Fifth—1784—; red and white ; calved Nov. 10th, 1890 ; bred by exhibitor; sire, Butterfly Duke, 501— ; dam, Oshawa Lass 2nd—660—, by Indian Chief—129,—, etc.

London :

1st, M. Ballantyne, St. Marys, "Gerty Lee"—1868—; red and little white ; calved Oct. 7th, 1890 bred by exhibitor ; sire, Lorne of Lee—579—; dam, Ada—1564—, by John L. Sullivan—362—, etc.
2nd, D. Morton & Sons, Hamilton, "Lottie"—1856—; calved Sept. 25th, 1890 ; bred by exhibitors ; sire, Royal Chief (imp.)—75—; dam, Jess (imp.)—1209—, by Farcross 3rd (637), etc.

Ottawa :

1st, Jos. Yuill, Carleton Place.
2nd, James Drummond, Petite Cote, Que., "Bet of Park Hill" 5461 ; sire, Rob Roy of Park Hill —876— ; dam, Bud of Park Hill—5720, etc.
3rd, W. C. Edwards & Co., Rockland, "Fadetta" 5589.

Four Calves under 1 Year Bred and Owned by Exhibitor.

Toronto :

1st, T. Guy, Oshawa.
2nd, Kains Bros., Byron.
3rd, W. Stewart, Jr., Menie.

Herd Consisting of One Bull and Four Females over 1 Year, Owned by Exhibitor.

Toronto :

1st, D. Morton & Sons, Hamilton.
2nd, J. McCormick, Rockton.
3rd, W. M. & J. C. Smith, Fairfield Plains.

London :

1st, D. Morton & Sons, Hamilton.

Ottawa :

1st, Jas. Drummond, Petite Cote, Que.
2nd, Thos. Brown, Petite Cote, Que.
3rd, W. M. & J. C. Smith, Fairfield Plains.

Female any Age.

Toronto :

D. Morton & Sons, Hamilton, "Maggie Brown of Barmoorhill" (imp)—1204—(5099).

London :

Kains Bros., Byron, "Jeanie of Auchenbrain" (imp.)—129—.

JERSEYS.

Bull, 3 Years Old and upwards.

Toronto :

1st, Mrs. E. M. Jones, Brockville. "Canada's Sir George," 18290 ; sire, Canada's John Bull, 8388 ; dam, Allie of St. Lambert, 24991.
2nd, Mrs. E. M. Jones, Brockville, "Masson's Son," 17608 ; sire, Hugo Chief of St. Anne, 12070 ; dam, Massena, 25732.
3rd, Geo. Smith & Son, Grimsby, "Nelles' John Bull," 21921 ; sire, Canada's John Bull ; dam, Nelle of St. Lambert, 27959.

London :

1st, Geo. Smith & Son, Grimsby.

Ottawa :

1st, Arken Stock Farm, Carleton Place, "Carlo of Glen Duart, 15037 ; sire, Actor of Hillhurst, 10404; dam, Betta of Hillhurst, by Victor 2nd, 263, etc.
2nd, Mrs. E. M. Jones, Brockville, "Masson's Son," 17608 ; see above, Toronto.
3rd, Mrs. E. M. Jones, Brockville, "Canada's Sir George," 18290 ; see above, Toronto.

BULL, 2 YEARS OLD.

Toronto :

1st, T. E. Brameld, Oakville, "Dolly's John Bull," 24540 ; sire, Canada's John Bull, 8388 ; dam, Dolly 2nd, 3288.
2nd, J. Maughan, Toronto, "Fawn King," 22791 ; sire, Canada's John Morgan, 16853 ; dam, Violet of Glen Duart 40710.
3rd, H. D. Smith, Compton, Que., "Stanley A.J.C.C. (25342.)

London :

1st, Jno. O'Brien, London West, "Hero of Spring Farm," 5858 ; sire, Hero of Oak Lawn 18343 ; dam, Queen of Maple Grove, 34792, etc.

Ottawa :

1st, W. C. Edwards & Co., Rockland, "Lisgar Pogis," 25704.
2nd, J. Bogart, Metcalfe.

BULL, 1 YEAR OLD.

Toronto :

1st, G. Osborne, Kingston, "Primrose Parks Pacha," 26303 ; sire, Canada's John Bull 5th : dam, Heiress of St. Lambert, 56507.
2nd, W. Johnson, Sweetborough, Que., "Rasselas St. Lambert," sire, Romes of St. Lambert 2nd, 17562 ; dam, Thaley, 14299.
3rd, Oakdale Stock Farm, Pickering, "Lucilla's Son" ; sire, Ollie Boy, 16668 ; dam, Lucilla Ruel, A.J.C C., 8892.

London :

1st, John O'Brien, London West, "London Lad," 5859 ; sire, Ashdale Duke, 9 ; dam, Eye of Hillhurst (imp.) 22808, etc.
2nd, A. Clark, Alvinston.

Ottawa :

1st, Isaac L. Woodly, Rockland, "Nero."

BULL CALF, UNDER 1 YEAR.

Toronto :

1st, Mrs. E. M. Jones, Brockville, "Massena's Combination.
2nd, Dawes & Co., Lachine, Que., "Consul," calved May 7th, 1891. Bred by exhibitors ; sire, Nero of Lachine, 14595 ; dam, Thalma's Wreins, 49661, by Thalma, 4258, etc.
3rd, A. McLean Howard, Toronto, "St. Elms of Glen Duart" ; sire, Chief of Duart, 24340 ; dam May of Glen Duart, 40709.

London :

1st, G. Smith & Son, Grimsby.
2nd, A. Clarke, Alvinston.

Ottawo :

1st, Mrs. E. M. Jones, Brockville, "Massena's Combination.

BULL, ANY AGE.

Toronto :

Mrs. E. M. Jones, Brockville, "Canada's Sir George," 18290.

London :

John O'Brien, Alvinston, "Hero of Spring Farm," 5858.

Ottawa :

Arken Stock Farm, Carleton Place, "Carlo of Glen Duart," 15037.

COW, 4 YEARS OLD.

Toronto :

1st, Mrs. E. M. Jones, Brockville, "Hugo Beauty."
2nd, Dawes & Co., Lachine, Que., "Pride of the Willows," 41625, calved March 4th, 1886. Bred by exhibitors ; sire, Draco of St. Annes, 13706 ; dam, Badier Bess, 30001, by Farmer's Glory, 196, etc.
3rd, Mrs. E. M. Jones, Brockville, "Massena."

Cow, 3 Years Old and Upwards.

London :

1st, Geo. Smith & Son, Grimsby.
2nd, Geo. Smith & Son, Grimsby.

Ottawa :

1st, Mrs. E. M. Jones, Brockville, "Hugo Beauty."
2nd, Mrs. E. M. Jones, Brockville, "Mulberry," (imp.)
3rd, Mrs. E. M. Jones, Brockville, "Lilium Excelsium."

Cow, 3 Years Old.

Toronto :

1st, Mrs. E. M. Jones, Brockville, "Jetsam's May," 62530; sire, One Hundred per Cent., 6590; dam, Jetsam, 32893, etc.
2nd, Oakville Stock Farm, Pickering, "Beulah, A.J.C.C." 67121.
3rd, Dawes & Co., Lachine, Que., "Promisee," 62218, calved May 4th, 1888. Bred by J. F. LeBas, St. Brellades Jersey; sire, Promise (957); dam, Louisville, (7014), etc.

Ottawa :

1st, Mrs. E. M. Jones, Brockville, "Jetsam's May." 62530. See above, Toronto.
2nd, Mrs. E. M. Jones, Brockville, "Massena's Maggie."
3rd, W. C. Edwards & Co., Rockland, "Favon's Mistake," 65786.

Heifer, 2 Years Old.

Toronto :

1st, Mrs. E. M. Jones, Brockville, "Minnette Pogis Second," 63205; sire, King Rioter 2nd, 15114; dam, Minnette Pogis, 2510.
2nd, Mrs. E. M. Jones, Brockville, "Belle Temple," Second," 66038; sire, Rioter of Parky Farm, 18183: dam, Belle Temple, 24946.
3rd, Wm. Rolph, Markham, "Heiress of St. Lambert," 65507; sire, One Hundred per Cent, 16590; dam, Peoney of St. Lambert.

London :

1st, Chas. A. Learn, Union.
2nd, R. Gibson, Delaware, "Belvoir Pet," 62242.

Ottawa :

1st, Mrs. E. M. Jones, Brockville, "Bell Temple 2nd," 66038. See above, Toronto.
2nd, Mrs. E. M. Jones, Brockville, "Lilium Excelsium 2nd."
3rd, Mrs. E. M. Jones, Brockville, "Minette Pogis 2nd," 63205. See above, Toronto.

Heifer, 1 Year Old.

Toronto :

1st, Dawes & Co., Lachine, Que., "Promisee 2nd," 65221, calved Jan. 30th, 1890. Bred by Chas. Renouf, Jersey; sire, Wendermere's Glory (1118); dam, Promisee, 62218, by Promise (957).
2nd, A. McLean Howard, Toronto, "Zarita of Glenhurst"; sire, Canada's John Morgan, 16853; dam, Rose of Hillhurst, 22806.

London :

1st, A. Clarke, Alvinston.
2nd, Geo. Smith & Son, Grimsby.

Ottawa :

1st, W. C. Edwards & Co., Rockwood, "Olive of Homewood," 65787.
2nd, Mrs. E. M. Jones, Brockville, "Rioter's Queen 2nd."

Heifer Calf, Under 1 Year.

Toronto :

1st, Mrs. E. M. Jones, Brockville, "Rioter's Princess"; sire, Rioter of Rocky Farm, 18183; dam, Princess Clothilde, 17041.
2nd, Mrs. E. M. Jones, Brockville, "Rioter's Lassie"; sire, Rioter of Rocky Farm, 18183; dam, Silye Lass, 36748.

London :

1st, J. O'Brien, London West, "Eye of Hillhurst 2nd," 12725; sire, Hero of Spring Farm, 5858; dam, Eye of Hillhurst (imp.) 22808, etc.
2nd, Geo. Smith & Son, Grimsby.

Ottawa :

1st, Mrs. E. M. Jones, Brockville, "Juliana of St. Lambert.

HERD, CONSISTING OF 1 BULL AND 4 FEMALES OVER 1 YEAR, OWNED BY EXHIBITOR.

Toronto:

1st, Mrs. E. M. Jones, Brockville.
2nd, Mrs. E. M. Jones, Brockville.

London:

Geo. Smith & Son, Grimsby.

Ottawa:

Mrs. E. M. Jones, Brockville.

FEMALE, ANY AGE.

Toronto:

Mrs. E. M. Jones, Brockville, "Mulberry."

London:

Chas. A. Learn, Union.

HOLSTEINS.

BULL, 3 YEARS OLD AND UPWARDS.

Toronto:

1st, A. C. Hallman & Co., New Dundee, "Netherland Statesman," 6337; sire, Statesman Netherland, 3280; dam, Cornelia Aggie 2nd, 4341.
2nd, Smith Bros., Churchville, "Mink's Mercedes Baron," 5676; sire, Mercedes Prince, 2150; dam, Mink, 402.
3rd, R. S. Stevenson, Ancaster, "Netherland Romulus," 6275.

London:

1st, Wyton Stock Breeders' Association, Wyton, "Baron Millburn," calved Feb. 16th, 1888; sire, Sir James of Aaggie, 1452; dam, Fadette, 2718, etc.
2nd, Wm. McClure, Norval, "Holland Rover," 8811; sire, Duke of Halton, 3070; dam, Doltje Koning 4th, 8299.

Ottawa:

1st, M. Riddell, Mohr's Corners, "Grip," 1105.
2nd, Jos. Fletcher, Oxford Mills, "Bubach," 15277.

BULL, 2 YEARS OLD.

Toronto:

1st, A. C. Hallman, & Co., New Dundee, "Royal Canadian, 14804; sire Netherland Prince; dam, Princess Agant, 5236.

BULL, 1 YEAR OLD.

Toronto:

1st, R. S. Stevenson, Ancaster, "Netherland Romulus," 6275; sire, Aggie Third's, Prince, 143; dam, Modest Girl, 10131.
2nd, Smith Bros., Churchville, "Sirannia Second's, Prince Castine," 16777; sire, Castine's Mercedes' Prince, 6304; dam, Sirannia 2nd, 10795.
3rd, J. C. McNiven & Son, Winona, "Siepkje Third's Mink's Mercedes Baron," 16041; sire, Mink's Mercedes Baron, 5676; dam, Mink, 402.

London:

1st, J. C. McNiven & Son, Winona, "Siepkje Third, Mink's Mercedes Baron," 10641. See above, Toronto.

BULL CALF, UNDER 1 YEAR.

Toronto:

1st, A. C. Hallman & Co., New Dundee, "Royal Aaggie Flegible"; sire, Royal Canadian, 14804; dam, Polianthus 2nd, 9167.
2nd, J. C. McNiven & Son, Winona, "Baron of Helderleigh," 16897; sire, Mink's Mercedes Baron, 5676; dam, Margaret, 4th, 18813.
3rd, Smith Bros., Churchville, "Siepkje Third's Mink Mercedes King," 30; sire, Mink's Mercedes Baron, 5676; dam, Siepkje 3rd, 2387.

London:

1st, Wyton Stock Breeders' Assn., Wyton, "Wadsworth," 17730, calved April 21st, 1891; sire, Baron Millburn, 8717; dam, Keturah, 1595, etc.
2nd, Wm. McClure, Norval, "Siepkje's Mink, Mercedes Baron"; sire Mink, Mercedes Baron, 6; dam, Siepkje, 36.

Ottawa :

1st, Jos. Fletcher, Oxford Mills, "Bubach 2nd."

Bull Any Age

Toronto :

A. C. Hallman & Co., New Dundee, "Netherland Statesman," 6337.

London :

Wyton Stock Breeders' Assn, Wyton, "Baron Millburn," 8717.

Ottawa :

Jos. Fletcher, Oxford Mills, "Bubach," 15277.

Cow, 4 Years Old and Upwards.

Toronto :

1st, Smith Bros., Churchville, "Cornelia Tensen," 1817 ; sire, Clymax, 70 ; dam, Cornelia, 750.
2nd, Smith Bros., Churchville, "Belle of Orchard Side Second," 6256 ; sire, Rothmere, 326 ; dam, Belle of Orchard Side, 235.
3rd, R. S. Stevenson, Ancaster, "Ideal," 8691 ; sire, Napoleon ; dam, Petronella.

Cow, 3 Years Old and Upwards.

London :

1st, J. C. McNiven & Son, Winona, "Maud Tensen," 11011 ; sire, Duke of Edgeley, 552 ; dam, Cornelia Tensen, 1887, etc.
2nd, Wm. McClure, Norval, "Edgeley Lass," 4055 ; sire, Earl Barrington, 2903 ; dam, Lize, 6292.

Cow, 3 Years Old and Upwards.

Ottawa :

1st, Wm. Fletcher, Kemptville.
2nd, Jos. Fletcher, Oxford Mills, "Ottile," 8807.
3rd, Jos. Fletcher, Oxford Mills, "Vronka," 9198.

Cow, 3 Years Old.

Toronto :

1st, J. C. McNiven & Son, Winona, "Maud Tensen," 11011. See above, London.
2nd, Smith Bros, Churchville, "Neth. Statesman's Beulah," 11940; sire, Neth. Statesman, 3280; dam, Beulah Fletcher 2nd, 9817.
3rd, J. C. McNiven & Son, Winona, "Lady Warringer Second," 16255 ; sire, Staveron, 3639 ; dam, Lady Warringer, 7978.

Ottawa :

1st, Jos. Fletcher, Oxford Mills, "Winston." 13940.
2nd, Wm. Fletcher, Kemptville.

Heifer, 2 Years Old.

Toronto :

1st, J. C. McNiven & Son, Winona, "Margaret Fourth," 18813 ; sire, Tecumseh, 5967 ; dam, Margaret, 1016.
2nd, A. C. Hallman & Co., New Dundee, "Princess Lida Second," 18510 ; sire, Neth. Mark, 4424 ; dam Princess Lida 2nd, 7130.
3rd, Smith Bros., Churchville, "Aaggie Adeline Sixth's Princess," 13030 ; sire, Prince of Artis, 2479 ; dam, Idaline Aaggie, 6th, 4366.

London :

1st, Wyton Stock Breeders' Assn., Wyton, "Fadetta 3rd," 15791, calved Feb. 15th, 1889 ; sire, Sir James of Aaggie, 1452 ; dam, Fadetta, 2718, etc.
2nd, J. C. McNiven & Son, Winona, "Margaret Fourth," 18813. See above, Toronto.

Ottawa :

1st, Jos. Fletcher, Oxford Mills, "Ethel Ashwin," 19651.
2nd, Wm. Fletcher, Kemptville.

Heifer, 1 Year Old.

Toronto :

1st, J. C. McNiven & Son, Winona, "Cressy Tennen," 23127 ; sire, Mink's Mercedes Baron, 5676 ; dam, Maud Tensen, 11010.
2nd, A. C. Hallman & Co., New Dundee, "Aaggie Netherland, Queen Elizabeth ; sire, Netherland States, 6337 ; dam, Queen of Waterloo, 14666.
3rd, A. C. Hallman & Co., New Dundee, "Bell of Springbrook," 22178 ; sire, Netherland States, 6337 ; dam, Polyanthus 2nd, 9167.

London :

1st, Wm. McClure, Norval, "Josie Lass," 21845; sire, Joe Black, 12939; dam, Edgeley Lass, 4055, by Earl Barrington, 2903, etc.

Ottawa :

1st, Jos. Fletcher, Oxford Centre, "Yoena," 25551.
2nd, Wm. Fletcher, Kemptville.

HEIFER CALF UNDER 1 YEAR.

Toronto :

1st, J. C. McNiven & Son. Winona "Clara Belle Sjut, 24736: sire, Mink Mercedes Baron, 5676; dam, Nitzyde Sjut, 18815.
2nd, R. S. Stevenson. Ancaster "———"; sire Netherland Romulus, 6275; dam, Cora Tensen, 9227.
3rd, Smith Bros., Churchville, "Siepkje Fourth's Mink Mercedes, 116; sire, Mink Mercedes Baron, 5676; dam, Siepkje Fourth, 10349.

London :

1st, J. S. McNiven & Son, Winona, "Cressy Tensen," 23127. See above, Toronto.
2nd, J. S. McNiven & Son, Winona, "Clarabell Sjut," 24736. See above, Toronto.

Ottawa :

1st, Jos. Fletcher, Oxford Mills, "May Queen."
2nd, Jos. Fletcher, Oxford Mills, "Princess."
3rd, Wm. Fletcher, Kemptville.

HERD CONSISTING OF 1 BULL AND 4 FEMALES, OVER 1 YEAR OLD, OWNED BY EXHIBITOR.

Toronto :

1st, Smith Bros., Churchville.
2nd, A. C. Hallman & Co., New Dundee.
3rd, J. C. McNiven & Son, Winona.

Ottawa :

Jos. Fletcher, Oxford Mills.

BULL AND 4 OF HIS PROGENY ANY AGE, OWNED BY THE EXHIBITOR.

Toronto :

A. C. Hallman & Co., New Dundee.

FEMALE ANY AGE.

Toronto :

Smith Bros., Churchville, "Cornelia Tensen," 1817.

London :

Wyton Stock Breeders' Assn., Wyton, "Fadetta 3rd," 15791.

STOCK SHOW COMMITTEE.

A joint meeting of Agriculture and Arts Stock Show Committee and Clydesdale and Horse Breeders' Association took place on December 21st, 1891, at 2 o'clock p.m

The following members were present, viz:—From Council of Agriculture, J. C Snell, (Chairman) R. Vance, A. Rawlings, J. Legge, C. M. Simmons, N. Awrey, H. Wade; from Clydesdale Association, Wm. Smith, President, John Bell, D. Sorby, J. Duff, R. Miller, R. Graham; from Shire Association, J. Gardhouse, President.

Before the joint meeting commenced the Committee from Council of Agriculture, accepted the requirements asked for, from the Clydesdale Association, viz:

That the Agriculture and Arts Association grant the sum of $200 and a gold medal to the Clydesdale prize list, at the Spring Stallion Show for 1892, allow the Clydesdale

Association to appoint their own Judges and prepare their part of prize list, to pay all expenses at Show, and collect all receipts. On motion of N. Awrey, seconded by C. M. Simmons, this was adopted.

Moved by N. Awrey, seconded by J. Legge, that this Committee have heard with sorrow of the death of Ira Morgan, Esq., one of this Council, and take this early opportunity to pass a vote of condolence to the widow and family of that gentleman, and that the Secretary be asked to prepare one and take to her. It reads as follows:

"That this Committee, having heard with emotions of deep regret of the serious accident which occured in Ottawa on the 18th of December last, and which resulted in the death a few hours later of our colleague, Ira Morgan, Esq., of Metcalfe, in the County of Carleton, who had been a continuous member of this Council since 1873, and during this time has filled with honor the distinguished office of President and Vice-President twice, first as President in 1876, the year of the Centennial in Philadelphia, when he also in that capacity acted as a Commissioner from Ontario; and in 1888 he was again appointed to the office of President. His untiring energy during this term of eighteen years very largely aided in promoting the welfare of this Association in its various undertakings. His manly exertions for the interest of the Ottawa Valley were marked. His presence will be greatly missed by all the members of this Council. We are sorry that it is not a full meeting of the Council, but are quite sure that we voice the feeling of the whole Board in taking this the earliest opportunity to offer the bereaved wife, family and relations of the deceased gentleman, its heartfelt sympathy and regret for the deep loss they have sustained by his untimely death.

"This Committee do also appoint a delegation consisting of Joshua Legge, Gananoque, a member of this Council and an intimate friend of the deceased, and Henry Wade, Secretary, Toronto, to proceed to Metcalfe and attend the funeral in behalf of this Association as a further mark of respect to his memory at the same time to present his bereaved widow with this preliminary memorial."

The joint meeting then commenced by going over last year's prize list. Thorough, bred, Carriage and Coach, Roadsters, Suffolk and Shires remain the same as last year. but all roadsters must either be registered in, or satisfactory evidence be given that they are eligible for registration in Wallace's Standard Book. The class of Percherons was struck out. The prizes for Hackneys, are to be given in two sections. First over 3 years, second 3 years and under, and the Prince of Wales prize to be given to the class for the Sweepstakes. Clydesdales were increased by another cash prize in the imported class, and the Canadian class to be increased by another section the same as the other.

For the Sweepstake prize it was moved by Mr. Awrey, seconded by Mr. Vance, that a $20 prize be given in each class, with the exception of Suffolk, that specials were not donated for. Moved by Mr. Simmons, seconded by A. Rawlings, that the annual show be held on the 9th and 10th of March next, in the Drill Shed so kindly loaned for the occasion by Lt. Col. Otter, Commandant. It was also moved by J. C. Snell, that Wm. Smith and H. Wade be a Committee to request the Mayor of Toronto to have the Drill Shed fixed up with seats and be the same as last year.

On motion, Messrs. John Bell, R. Graham, R. Miller and H. Wade were appointed to collect subscriptions to add to the prize list.

It was resolved that Messrs Awrey, Snell and Simmons be appointed a Committee to meet with the Clyde and Shire Committees on the day of the Clydesdale annual meeting to select judges for the Spring Show.

The meeting then adjourned.

ONTARIO VETERINARY COLLEGE.

The Graduating Class, March 28th, 1891.

Name.	P. O. Address.
Alexander, John E	Mascouchie Rapids, P.Q.
Anewalt, M. T.	Pleasant Hill, Ohio.
Appleyard, Edward	Grand Valley, Ont.
Augustin, David T	Calton, Ont.
Barnes, Frank M.	St. Thomas, Ont.
Barr, J. W.	Milverton, Ont.
Batchelder, H. M	Warrensburgh, Ill.
Belaire, G. H	Pembroke, Ont.
Boothby, Jas. T	Altona, Ont.
Bowen, Hamilton	North Fairfield, Ohio.
Bowlby, Percival T.	Port Dover, Ont.
Brossman, C. W.	Lower Heidelberg, Penn.
Brown, Alexander H	Pipestone, Minn.
Brown, Bruce E	St. Catharines, Ont.
Brown, Wm. A.	Pipestone, Minn.
Bryan, Robert M	Lexington, Ky.
Burdick, Wm. M	Grovesend, Ont.
Burkholder, S. G.	Denver, Penn.
Burkholder, Samuel	Virden, Man.
Burneson, James C	Mansfield, Ohio.
Crowforth, Anderson	Brampton, Ont.
Callander, E. H	Kirkton, Ont.
Carl, Lewis W	Campchaise, Ohio.
Carnes, Will E	Greenwood, Ind.
Claussen, William R	Waupaca, Wis.
Clevenger, Walter C	Union City, Indiana.
Cobleigh, E. J	Parkhill, Ont.
Collins, S. J	Green River, Ont.
Connolly, Vilroy M	Owatonna, Minn.
Corlis, Wilson S	Carthage, N.Y.
Crawford, Eli M	Brampton, Ont.
Creamer, John P	Regina, N.W.T.
Crewe, Wilton F	Hillsboro, North Dakota.
Cunnington, W. J	Parkhill, Ont.
Cole, Louis M	Toledo, Ohio.
Drury, James	Toronto, Ont.
Dunn, Lewis J	Erie, Penn.
Dietz, Joseph H	Owatonna, Minn.
Edmonds, Charles E	Fingal, Ont.
Everist, James Cicero	Arkona, Ont.
Findlay, Alex	Toronto, Ont.
Fitzgerald, George M	Chiselhurst, Ont.
Foster, J. E	Mt. Eaton, Ohio.
Frank, Albert A.	Great Valley, N.Y.
Freed, Byron M	Sharon, Pa.
Genung, John A	Slaterville Springs, N.Y.
Gibb, James Mitchell	Kingston, Jamaica.
Gillies, Duncan R	Moffatt, Ont.
Gray, Whitfield	Newton, N.Y.
Galbraith, W. C	Brampton, Ont.
Hackett, Charles H	Linwood, Ont.
Hagerman, John M	Lynedoch, Ont.
Hanawalt, D. C	Frankfort, Ohio.
Hanisch, J. A	Lake City, Minn.
Hodgins, J. E	Mooreville, Ont.
Holmes, Ernest Burwell	London, England.
Honan, J. H	Delphi, Ind.
Hopkins, Arthur Geo.	London, England.
Harrison, Richard	Bad Axe, Mich.
Jobson, John A	Franklin, Penn.
Johnston, Herbert J	Jasper, Ont.
Johnston, Joseph B	Gallipolis, Ohio.
Kane, Elisha K	Warren, Ill.
Kaul, William	St. Marys. Penn.
Keeler, Allan Z	Harleysville, Penn.
Kelley, James S.	Irvine, Ill.
Kelley, Robert L	Irvine, Ill.
Kershner, Peter I	Bernville, Penn.
King, Joseph E	Palmyra, Ill.
Kinter, Joseph Brady	Marion Centre, Penn.
Klotz, J. W.	Arcadia, Ind.
Kyle, Foster J.	Cedarville, Ohio.
Lamberson, A. J	Whitehall, Wis.
Langford, D. C	Mason City, Iowa.
Lyon, Henry C	Grandon, Dakota.
Lewis, David	Omemee, Ont.
McLellan, Clarence	Greenwood, Ind.
McCurdy, Uri Burtton	Hutchison, Kansas.
McLoughry, R. A.	Wolseley, N.W.T.
McLaren, W. H.	Fargo, North Dakota.
Macdonald, Robert	Emerson, Man.
Machan, Alex.	Mitchell, Ont.
Marsack, H. L	Tunbridge Wells, Eng.

THE GRADUATING CLASS, MARCH 28TH, 1891.

Name.	P. O. Address.	Name.	P. O. Address.
Moore, George W	Burgessville, Ont.	Sanson, Alexander	Petrolea, Ont.
Morrison, Andrew Smith	Bristol, P.Q.	Shadwell, W. H	Burgess Hill, Sussex, Eng
Morrissey, Thomas	De Witt, Iowa.	Shain, Charles	London, Ont.
Mountford, John Joseph	Blenheim, Ont.	Shirley, Victor W	Waterford, Ont.
Moyer, W. H	Pottsville, Penn.	Sisson, Septimus	Manhattan, Kansas.
Manley, H. M	Arkansas City, Kansas.	Smith, Alexander Esdale	New Perth, P.E.I.
Neale, Geo. C	Parkhill, Ont.	Smith, Richard H	St. Marys, Ont.
Neilson, W. G	Battleford, N.W.T.	Stinson, W Spence	Orangeville, Ont.
Nixon, W. A	Brampton, Ont.	Storey, Mark A	Princeton, Ill.
		Sowers, John B	Greencastle, Penn.
Ovens, Hubert A	Maple Lodge, Ont.	Taylor, William R	Winnipeg, Man.
Piatt, D. Augustus	Lexington, Ky.	Thacker, Thos	Portage du Fort, P.Q.
Palmer, Charles F	Wooster, Ohio.	Teeple, Sherman L	Napoleon, Ohio.
Parker, A. L	Providence, R.I.	Thompson, Joseph A	Elginfield, Ont.
Parslow, J. G	Clarinda, Iowa.	Thompson, Samuel	Roseneath, Ont.
Pendergast, James A	Phœnix, N.Y.	Tolmie, S. F	Victoria, B.C.
Porter, Edmond C	Waterford, Penn.	Turner, W. George	Pt. Edward, Ont.
Potteiger, Albert R	Bernville, Penn.	Thomson, Joshua P	Uptergrove, Ont.
Price, J. O. F	Sibley, Iowa.	Tilt, Fred	Brampton, Ont.
Pullen, Wm. H	Lebanon, Ohio.	Vanderslice, Delo	Salem, Ohio.
Rhodes, Jackson	Uxbridge, Ont.	Vliet, George B	Hackettstown, N.J.
Rich, Theodore S	Avon, N.Y.	Vulliamy, Hugh F	Ipswich, England.
Robb, George	London, Ont.	Walsh, Ernest J	Oakville, Ont.
Robinson, Ralph B	Brooklin, Ont.	Ward, U. E	Overton, Neb.
Rollings, John W	Lancaster, S.C.	Wadsworth, W. J	Murray, Ont.
Robinson, Nathaniel	Dresden, Ont.	Wilson, A. M	St. Marys, Ont.
Ronan, J. L	Auburn, N.Y.	Williams, Joseph E	Fingal, Ont.

THE GRADUATING CLASS, DEC. 22ND, 1891.

Bogart, Edgar A	Kettleby, Ont.	Kidd, Richard T	Listowel, Ont.
Brooke, Thomas H	Don, Ont.	Law, John Edwin	Ithaca, N.Y.
Brownridge, George C	Brampton, Ont.	Leslie, Charles F	York, Neb.
Carter, James Conrad	Gowanda, N.Y.	Myers, B. B	Linville, Va.
Chesney, James H	Brucefield, Ont.	Poole, Bernard R	England.
Colvin, John M	Wingham, Ont.	Stevenson, Robert E.	Toronto, Ont.
Corsant, Thomas A	Ilderton, Ont.	Wilhelm, Jacob	Shakespeare, Ont.
Elgas, Adam	Hartford, Mich.	Willson, Louis A	Eglinton, Ont.
Elliott, William	Delhi, N.Y.	Young, George E	Toledo, Ohio.
Fotheringham, Joseph	Mason City, Iowa.		
Gibb, George H	St. Mary's, Ont.		

TREASURER'S REPORT FOR 1891.

Geo. Graham, Treasurer in account with the Agriculture and Arts Association for the year ending 31st December, 1891.

1891.	RECEIPTS.	No.	$ c.	$ c.
	To Balance from last year	....	....	1,908 58
	REGISTRATION FEES.			
Feb. 13	Registration fees, H. Wade, for month of January	....	245 75	
Mar. 23	" " " February	......	352 25	
Apr. —	" " " March	......	316 28	
May 26	" " " April	....	267 75	
June 24	" " " May		89 00	
Aug. 12	" " " June	....	72 25	
Sept. 4	" " " July	.....	188 50	
Oct. 23	" " " August	......	215 00	
" 23	" " " September	......	194 50	
Dec. 4	" " " October	....	132 25	
" 17	" " " November	.....	101 75	
" 31	" " " December	......	135 75	2,311 03
	HERD BOOK.			
Feb. 13	H. Wade, Herd Books sold	......	61 55	
Mar. 23	" "	.....	39 55	
Apr. —	" "	.....	22 30	
May 26	" "	......	22 50	
June 24	" Petty cash	......	5 45	
Aug. —	" Herd Books sold	....	67 00	
Sept. 4	" "	.....	68 65	
Oct. —	" "	....	9 00	
Nov. 25	" "	.....	28 80	
Dec. 4	" "	.....	7 00	
" 17	" "	.....	4 20	
" 31	" "	......	37 05	373 05
	OTTAWA'S LAST SHOW.			
Sept. 21	Murphy's note for booths and proceeds	......	270 00	270 0
	SPRING HORSE SHOW.			
Oct. 20	Coach Horses Society	.....	50 00	
Mar. 11	Entry fees—Horse Show	...	109 00	
" 11	Catalogues sold	......	36 75	
" 11	Gate receipts—first day	......	117 95	
" 11	" second day	....	197 25	
" 11	Prizes, Shire Horse Association	......	30 00	
" 11	Clydesdale Horse Association	......	390 00	
" 31	Toronto Hunt Club's subscription	.....	25 00	
May 26	Electoral Division grant	......	20 00	975 95
	RENT ACCOUNT.			
Mar. 31	P. Jamieson, rent to first of February	......	500 00	
June 10	" " " May	......	500 00	
Oct. —	" " " August	......	500 00	
Dec. 19	" " " November	......	500 00	2,000 00
	Carried forward	......	....	7,838 61

TREASURER'S REPORT FOR 1891.—*Continued.*

1891.	RECEIPTS.	No.	$ c.	$ c.
	Brought forward			7,838 61
	GOVERNMENT GRANT.			
May 29	H. Wade, deposited on account		2,500 00	
Sept. 14	Provincial Treasurer's cheque—balance		2,850 00	
				5,350 00
	INTEREST ACCOUNT.			
Aug. 12	Prince of Wales' mortgage loan, six months' interest		28 00	
Dec. 31	Half year's interest on Prince of Wales' loan		28 00	
				56 00
	Total receipts			13,244 61
	DISBURSEMENTS.			
	MISCELLANEOUS.			
Jan. 3	Henry Wade sundries, (red book)	1	14 63	
" —	Cheque redeemed, A. Moyer & Co., dated 1877	2	3 00	
" 19	Telegrams, etc., H. Wade	7	3 89	
Feb. 13	H. Wade, ribbon from W. A. Murray & Co's	17	16 46	
Apr. 21	Specialty Manufacturing Co., supplies	63	3 85	
" 21	Edwards, Catchpole & Co., mucilage	63½	1 50	
May 21	Henry Wade, sundries (red book)	69	11 81	
" 21	" " G.T.R. and C.P.R.		13 00	
June 24	" " sundries	80	18 55	
Aug. 8	" " lights for sidewalk	85	10 00	
Dec. 11	Journal for Treasurer's office	134	40	
" 11	H. Wade, expenses visiting stock shows in N. W. T.	135	50 00	
Nov. 23	Henry Wade, red book expenses	117	31 90	
" 27	Hon. R. Harcourt, heating offices	140	200 00	
Dec. 24	H. Wade, expenses, Mr. Morgan's funeral	145	19 44	
	J. Legge, " "	146	12 00	
" 25	H. Wade, for A. C. Campbell, reporting	147	12 00	
				422 43
	INTEREST ACCOUNT.			
Jan. 3	J. I. Hobson, interest on Miss Loughrin's mortgage	4	300 00	
Aug. 26	" " " "	91	300 00	
				600 00
	COUNCIL EXPENSES.			
Feb. 13	Joshua Legge, Central Farmers' Institute	16	26 64	
Mar. 12	Meeting of members of Council	24	221 36	
June 24	Members of Council attending meeting	78	199 60	
July 6	Members of Committee meeting at Ottawa	81	51 12	
Sept. 19	Meeting of Committee at Toronto	98	42 48	
Dec. 11	Members meeting at Guelph	137	235 23	
				776 43
	SALARIES.			
Jan. 3	J. I. Hobson and Jos. Bigelow, each $15	3	30 00	
" 19	H. Wade, salary for January	8	180 00	
Feb. 17	" " February	23	180 00	
Mar. 23	" " March	43	180 00	
	Carried forward		570 00	1,798 86

TREASURER'S REPORT FOR 1891.—*Continued.*

1891.	DISBURSEMENTS.	No.	$ c.	$ c.
	Brought forward		570 00	1,798 86
	SALARIES—*Continued.*			
Mar. 23	Geo. Graham, salary for quarter to April 1st	44	25 00	
Apr. 23	H. Wade, " April	62	180 00	
May 21	" " May	66	180 00	
June 24	" " June	75	180 00	
" 24	Geo. Graham, " quarter to 1st July	76	25 00	
" 24	" special salary for expenses	77	25 00	
July 20	Henry Wade, salary for July	84	180 00	
Aug. 25	" " August	89	180 00	
Sept. 17	" " September	93	180 00	
" 19	Geo. Graham, " quarter to 1st October	93½	25 00	
Oct. 23	Henry Wade, " October	106	180 00	
Nov. 23	" " November	118	180 00	
Dec. 18	" " December	142	180 00	
" 28	Geo. Graham " quarter to January 1st	148	25 00	
				2,315 00
	HERD BOOK.			
Jan. 19	Henry Wade, Herd Book expenses	6	7 35	
May 21	" for Herd Books	68	7 60	
June 12	The Mail Job Printing Co	73	6 95	
" 12	Hunter, Rose & Co., printing and binding	74	127 00	
July 20	" " Herd Book	83	600 00	
Mar. 23	The Mail Job Printing Co., printing Herd Books	45	25 75	
Dec. 4	D. Rose, printing Herd Book	244	600 00	
				1,374 65
	LIBRARY.			
Feb. 13	Henry Wade, library expenses	19	6 50	
				6 50
	POSTAGE.			
Jan. 19	Henry Wade, postage	5	15 00	
Feb. 13	" "	18	13 00	
" 13	" " stamps	21	15 75	
Mar. 23	" " registration fees	42	20 25	
Apr. 6	" " red book expenses	47	28 71	
" 23	" " " "	61	12 26	
" 23	" " stamps registration fees for March	61½	15 28	
May 21	" cheque for postage		11 00	
" 26	" postage stamps registration fees for April	70	14 25	
June 24	" " " " " May	79	5 00	
Aug. 8	" " " " " June	86	11 50	
Aug. 25	" " " (red book)	90	13 92	
Sept. 4	" " " registr'n fees for July	92	11 25	
Oct. 23	" " " " August	102	20 00	
" 23	" " " " September	103	23 75	
Dec. —	" " " " November	141	14 25	
" 4	" " " " October	132	12 50	
" 6	Cheque for postage stamps for Treasurer	133	3 00	
" 31	Postage stamps as registration fees	149	22 75	
				283 42
	Carried forward			5,778 43

TREASURER'S REPORT FOR 1891.—*Continued.*

1891.	DISBURSEMENTS.	No.	$ c.	$ c.
	Brought forward			5.778 43
	PRINTING AND STATIONERY.			
Feb. 13	Edwards, Catchpole & Co., ink	14	1 20	
" 15	James Bain & Son, stationery, etc	15	9 00	
Mar. 27	Brown Bros., expenses	41	7 85	
Apr. 23	Brown Bros., supplies, Secretary's office	57	13 95	
" 23	Alexander & Cable, lithographs	58	60 00	
Aug. 17	Brown Bros., stationery	87	19 40	
" 17	Mail Printing Co	88	12 75	124 15
	SPRING HORSE SHOW.			
Jan. 19	Committee Spring Horse Show	9	54 85	
Apr. 6	The *Mail* Printing Co	48	18 75	
" 6	Judge Charlton, extra	49	6 00	
" 6	Scott & Cross, sawdust	50	3 00	
" 6	Police Office, help	51	5 00	
" 6	The *Empire* Printing Co	52	18 75	
" 6	The *Mail* Job Printing Co	53	57 00	
" 6	The *Globe* Printing Co	54	16 50	
" 6	*Farmers' Advocate*	55	3 00	
" 23	Gravel and sawdust	60	16 75	
" 23	Wm. Weld, advertising Show	64	6 00	
Mar. 23	Printing for Spring Horse Show	45	68 75	274 35
	OFFICE EXPENSES.			
Feb. 10	Henry Wade, office expenses	20	5 71	
Apr. 6	2 qts. mucilage, Edwards, Catchpole & Co	46	1 00	
" 23	1 roll manilla paper	59	1 00	
Oct. 31	H. Wade, red book expenses	105	20 60	
Sept. 17	" "	94	15 00	43 31
	PRINTING.			
Feb. 27	The Mail Job Department, printing	22	75 55	
Apr. 21	" " "	65	14 50	
Oct. 31	" " "	107	34 30	
Nov. 23	The Mail Job Printing Co	119	7·00	131 35
	CLYDESDALE HORSE SHOW.			
Mar. 12	Prizes	25	1,140 00	
" 12	Judges	26	5 00	
" 12	S. Kisey & Son, prizes	26½	20 00	
" 12	H. G. Wade, services	28	4 00	
" 12	H. B. Hall, clerking, Horse Show	29	4 00	
" 12	A. Smith, V. S.	30	10 00	
" 12	T. R. Smith, caretaker	31	3 50	
" 12	Wm. N. Wade, services	32	2 00	
" 12	Brady & Bell, carpenters, door-keeper	33	15 85	
" 12	John Morrison, judge	34	5 00	
" 15	Asa Choate, "	35	5 00	
" 15	Samuel Stokes "	36	5 00	
" 15	E. G. Charlton, "	37	6 00	
" 15	H. Jackman & Co., posting bills	38	4 15	
" 15	— Dickey, reporting meeting	39	7 50	
" 15	Sand expenses	40	7 00	1,244 00
	Carried forward			7,595 59

TREASURER'S REPORT FOR 1891.—*Continued.*

1891.	DISBURSEMENTS.	No.	$ c.	$ c.
	Brought forward			7,595 59
	INSURANCE.			
Mar. 12	Henry Wade, insurance paid	27	18 75	
July 8	Paid insurance on building	82	65 00	83 75
	VETERINARY COLLEGE.			
Apr. 23	R. Vance, attending committee	56	10 05	10 05
	DOMINION S. H. BREEDERS' ASSOCIATION.			
May 29	Paid Dom. S. H. B. Ass'n as per resolution	71	1,000 00	1,000 00
	PRIZE ACCOUNT.			
June 12	John Wanless, medals	72	73 00	
Oct. 23	" "	105	499 50	
Dec. 11	" "	136	109 00	681 50
	REPAIRS TO BUILDINGS.			
Sept. 19	Denison & King, repairing pavement	95	6 00	
Nov. 23	Cutting stones in flagging	120	5 25	11 25
	WORLD'S FAIR COMMITTEE.			
Nov. 27	Members of Committee, attendance	122	104 90	104 90
	PRIZE FARMS.			
Sept. 19	J. I. Hobson, judging farms	96	130 00	
" 19	Fred. W. Hodson, judging farms	97	130 00	260 00
	PLOWING MATCH.			
Oct. 20	N. Awrey, plowing match	99	150 00	
" 20	J. C. Snell, "	100	150 00	
" 21	A. Rawlings, "	101	150 00	
" 23	Joshua Legge, "	104	150 00	600 00
	LEGAL EXPENSES.			
Oct. 31	C. J. Holman & Co., legal attendance	109	5 00	5 00
	STOCK SHOW COMMITTEE.			
Oct. 31	Members attending Committee	110-116	85 92	
Dec. 21	" "	143	77 86	163 78
	FAT STOCK SHOW.			
Dec. 4	John McCorkindale, Treasurer Fat Stock Show	131	300 00	300 00
	Total Disbursements			10,815 82
	Balance on hand, December 31st, 1891			2,428 79

JOHN I. HOBSON, }
JOSEPH BIGELOW, } *Auditors.*

TORONTO, January 4th, 1892.

Abstract Financial Statement showing Receipts, Disbursements, Assets and Liabilities of the Agriculture and Arts Association for the year ending December 31st, 1891.

RECEIPTS.	$ c.	DISBURSEMENTS.	$ c.
Balance from 1890	1,908 58	Miscellaneous	422 43
Registration fees	2,311 03	Interest account	600 00
Herd book sales	373 05	Council expenses	776 43
Ottawa Show, balance for booths	270 00	Salaries	2,315 00
Spring Horse Show, 1891	975 95	Herd books	1,374 65
Rent account, 1891	2,000 00	Library	6 50
Government grant, 1891	5,350 00	Postage	283 42
Interest account, Prince of Wales mortgage	56 00	Printing and stationery	124 15
		Horse Show, 1891, printing and expenses	274 35
		Office expenses	43 31
		Printing account	131 35
		Clydesdale Horse Show, 1891	1,244 00
		Insurance	83 75
		Veterinary College	10 05
		Dominion Short Horn Breeders' Ass'n.	1,000 00
		Prize medals	681 50
		Repairs to buildings	11 25
		Plowing matches	600 00
		Legal expenses	5 00
		Stock Show Committee	163 78
		Fat Stock Show	300 00
		Columbian World's Fair Committee	104 90
		Prize farms	260 00
		Cash on hand	2,428 79
Total	$13,244 61	Total	$13,244 61

ASSETS.	$ c.	LIABILITIES.	$ c.
Cash in bank	2,428 79	By mortgage on real estate	10,000 00
Real estate	60,000 00	By balance of assets over liabilities	57,328 79
Library	1,500 00		
Prince of Wales fund	800 00		
Office furniture and safe	600 00		
Clydesdale Stud Book	2,000 00		
Total	$67,328 79	Total	$67,328 79

To the Council of the Agriculture and Arts Association:

GENTLEMEN,—We, your Auditors, beg leave to report that we have examined the Treasurer's books and accounts, and find vouchers for the disbursements correct, showing a balance in the Treasurer's hands deposited in the bank to the credit of the association of $2,428.79 on the 31st day of December, 1891.

JOSEPH BIGELOW, } Auditors.
JOHN I. HOBSON, }

TORONTO, January 4th, 1892.

UNIVERSITY OF TORONTO.

REPORT OF

STANDING COMMITTEE

ON FINANCE.

ADOPTED NOVEMBER 14TH, 1891.

TORONTO:
PRINTED BY WARWICK & SONS, 68 AND 70 FRONT STREET WEST
1891.

TORONTO, November 6, 1891.

H. H. LANGTON, Esq.,
Registrar of the Senate,
University of Toronto,
Toronto.

SIR,—1. It may be convenient to the Senate that the enclosed report of the Finance Committee should be accompanied by a statement, in greater detail than would have been proper in a report for 1892, of the conjectural position of the University in 1893, under the scheme of expenditure which, in order to carry out the most urgent requirements of the report of April last, the Committee have felt bound to submit. I am, of course, solely responsible for the prior presentation, as well as the contents of this statement, which ordinarily would have been made verbally when moving the adoption of the report; but a consideration of which will, I think, be facilitated by the prior distribution of this paper.

2. The revenues of the University will, in all probability, be at no very distant period greatly enlarged, as is sufficiently shown by the fact that offers for the westerly part of the Park estate and for the Upper Canada College block, aggregating over $900,000, have, within the last few months, been declined, the authorities hoping to dispose of these valuable properties by degrees at enhanced prices.

3. But meantime the depression in Toronto real estate deepens, and the prospect of early relief by sales diminishes. Meantime, also, these properties are about to become burdensome rather than beneficial to the revenues. For example, the improvements necessary to put Devonshire Place on the market will involve a charge or loss of interest of about $1,500; while the annual charges to be assumed by the University in connection with its acquisition of the U. C. College block, not yet ascertained, may perhaps reach, including a sum for local improvement, $7,500.

4. There seems but one way of dealing with these charges at present, namely, to pay them, with interest thereon, out of capital; treating them as investments in the acquisition or development of unproductive real estate; and charging that estate with the annual payments and with interest thereon; a process which, however legitimate it may be, will yet, if long continued, result in the transfer of a substantial part of the interest-bearing capital to accounts at present almost unproductive.

5. Leaving out of the accounts on either side the unproductive lands, the condition of the expenditure account in 1893, on the basis of the recent additions thereto, and of those suggested in the accompanying report, and of those involved in the building schemes now in hand, may be very roughly estimated as follows:—

6. The ordinary expenditure estimated for 1892 is largely swelled by certain additions to the staff already made pursuant to the report of April last and otherwise. Besides these it comprises further payments proposed to be sanctioned as follows:—

Salaries		$2,894 00
Increases for twelve months to bring Retirement Fund into operation—		
Payable to officers	$887 50	
Payable to fund	2,312 50	
	$3,200 00	
Proportion for nine months		2,400 00
Total		5,294 00

7. Including these sums the estimated ordinary expenditure for 1892 is	96,378 60
While the estimated ordinary revenue, after deducting $5,000 for Contingent Fund, is	91,823 16
(*a*) This shows a deficiency (met in 1892 out of abnormal receipts but to be met in 1893 out of ordinary revenue of	4,555 44
(*b*) Add for 1893 three months to complete retirement fund increases	800 00
(*c*) Add for 1893 net increases in charge for salaries for 1892 already sanctioned as follows :—	

	1892.	1893.
Librarian	$900 00	$1,300 00
Acting Assistant Librarian	350 00	....
Professor, Ethics	2,250 00	3,000 00
Lecturer, German	600 00	900 00
Lecturer, French	600 00	900 00
Lecturer, Latin	600 00	900 00
Demonstrator, Chemistry	600 00	900 00
Totals	$5,900 00	$7,900 00

Increase	2,000 00
(*d*) Add maintenance new Library, conjectured	1,500 00
(*e*) Add interest on cost of Chemical building provided out of guaranteed debentures, $60,000 at 4 per cent. (apart from technical equipment not provided for)	$2,400 00
(*f*) Add maintenance of Chemical building, conjectured	1,500 00
(*g*) Add interest on cost of Gymnasium, etc., to be provided out of guaranteed debentures, $20,000 at 4 per cent (Equipment and maintenance to be provided by subscriptions and students' Gymnasium fees.)	800 00
Total	$13,555 44

being the minimum to be provided for in 1893 in excess of the ordinary revenue of 1892, not including any further provision for Mineralogy and Geology, or for equipment of the Chemical building or for equipment out of general funds of Museum or Main building.

8. The possible additions to revenue for 1893 to meet this excess of expenditure may be conjectured rather than estimated as follows :—

(*a*) Fees, School of Science Occupation rent, School of Science Degree fees, Agriculture	$3,500 00
(*b*) Proportion of expenses of maintenance and repairs of Biological and Chemical buildings to be refunded out of Medical Faculty funds	1,000 00
(*c*) New Library fees	2,000 00
(*d*) Increase in tuition fees due to extension and new facilities	2,500 00
(*e*) Interest earned by restoration to capital of $100,000 spent on Biological building, replaced out of proceeds of guaranteed debentures at 4 per cent., producing a net return of say 1½ per cent., or $1,500 over debenture interest	1,500 00
Total	$10,500 00
which being deducted from the total increased expenditure as above	13,555 44
still leaves a deficiency of	$3,055 44

9. This, or a much greater deficiency, may be bridged over by the adoption in whole or part of the following expedients :—

(*a*) Temporary reduction in customary Library grant, to be replaced by temporary application to the same purpose of the interest on Library insurance fund	$2,000 00
(*b*) Temporary suspension of contingent fund	5,000 00
(*c*) Temporary suspension of increases applicable to retirement fund..	2,312 50
Total........	$9,312 50
Besides which there is possible :—	
(*d*) Increase in tuition fees	
(*e*) An addition to the revenue from new land sales	

10. Some of the conjectures of expenditure and receipt contained in the Finance Committee's Report and some of those above given are necessarily so vague, and there are so many disturbing elements and unconsidered contingencies on both sides of the account, that it would not be prudent to calculate on a favorable realization; but by making use of all the expedients suggested the accounts can be balanced even on the most unfavorable calculation which can be reasonably made; yet some of the suggested expedients are so undesirable that they should be contemplated only as a last resource.

11. These considerations show the exceptional gravity of the situation, and the weight of responsibility which now rests on the Senate in the discharge of its duty under the Statute creating the Finance Committee. It will be for the Senate to decide whether, in the effort to advance the great objects of the report of April last, it is right, as proposed by the Committee, to encounter some risks which under ordinary circumstances it would decline.

I have, etc.,

EDWARD BLAKE.

UNIVERSITY OF TORONTO.

REPORT OF STANDING COMMITTEE ON FINANCE.

November 2nd, 1891.

The Standing Finance Committee beg to make the following report with reference to the matters to them referred under Statute 231.

1. They have obtained from the Bursar his estimates of the items of probable receipt, and have obtained from the Bursar and the Registrar and the heads of departments estimates of the probable expenditure, and have enquired into and considered and amended the same, and have submitted to the Board of Trustees their conclusions as hereinafter expressed, and they append a resolution of the Board thereon.

2. In tabulating the results they have, in all matters as far as possible, adopted, for the sake of convenience and comparison, the forms of tables used in the recent report of the Committee of the Senate and Board of Trustees on revenues and requirements, and they refer throughout to the page of that report containing the comparative tables relevant to the statement in hand.

3. They give the actual results as reported to them by the Bursar for the year 1890-1891, as well as the estimates for the year 1891-2.

RECEIPTS ACCOUNT—INCOME.

I. General Revenue.

——	Estimate, 1892.	Receipt, 1891.
	$ c.	$ c.
(*a*) Interest on balance purchase moneys (old sales)	798 00	1,022 90
Interest on balance purchase moneys (new sales, Devonshire place and vicinity)	1,582 40	
(*b*) Interest on loans	35,415 33	35,406 97
Interest on debentures (Including interest on Scholarship foundations to be written to the credit of that account, for 1892, $1,285; written for 1891, $1,010).	21,758 93	21,866 02
(*c*) Surplus interest on general bank balances, including interest at 6 per cent. on U. C. College overdraft by arrangement made during building of College	200 00	4,120 83
(*d*) Rents (other than Park)	3,375 00	2,756 07
Rents, University Park	8,324 00	9,005 47
Allowance for rent for occupation by Medical Faculty of part of new building, as proposed by report, page 25	1,200 00	
Carried forward	72,653 66	74,178 26

General Revenue—*Continued.*

——	Estimate, 1882.	Receipt, 1891.
	$ c.	$ c.
Brought forward	72,653 66	74,178 26
(*e*) Fees, University and College :—		
To go to University and College $20,380 00		
To go to Medical Faculty 820 00	21,200 00	23,369 89
(*f*) City payment	6,000 00	6,000 00
(*g*) Transfer fees	50 00	38 00
(*h*) Dividend on bank stock	24 50	24 50
(*i*) Casual accounts :—		
Insurances *re* Mortgages	....	67 18
Total	99,928 16	103,677 83
Deduct for allowance for loss of and reduction in interest	1,000 00	
Total general revenue for year	98,928 16	103,677 83

II. Interest on Special Funds.

——	Estimate, 1892.	Receipt, 1891.
	$ c.	$ c.
(*k*) Bank interest on building insurance and grant fund, to be written to credit of restoration of building account	250 00	2,421 40
(*l*) Bank interest on library building fund (donations), to be written to credit of library building fund	1,300 00	1,386 00
(*m*) Bank and other interest on library insurance fund (books), to be written to credit of library insurance fund (books) account	2,000 00	2,333 33
(*n*) Bank interest on library restoration fund (books, donations) to be written to credit of library restoration fund (books) account	120 00	235 56
(*o*) Bank interest on furniture and utensils insurance fund, to be written to credit of restoration of furniture, etc., account	50 00	160 00
(*p*) Bank interest on museum insurance fund, to be written to credit of restoration of museum account	140 00	323
(*q*) Bank interest on residence extension fund, to be written to credit of that account. Credit omitted in 1891	23 38	
(*r*) Interest at 5 per cent. on medical faculty surplus account as re-adjusted, to be written to credit of that account. Credit omitted in 1891	534 50	
(*s*) Bank interest on students' fund and gymnasium account, to be written to the credit of that account. Credit omitted in 1891	9 20	
(*t*) Bank interest on University club and gymnasium account (subscription), to be written to credit of that account. Credit omitted in 1891	62 80	
(*u*) Bank interest on Vice-Chancellor's special account, to be written to the credit of that account. Credit omitted in 1891	23 52	
Totals	4,563 40	6,859 29

III. ABNORMAL RECEIPT FOR 1892.

ABNORMAL RECEIPTS.	Estimate 1892.	1891.
	$ c.	$ c.
(v) Fees. Receipt due to re-transfer of fees from Medical Faculty surplus account, available for special services for 1892	4,751 94	
(w) Surplus income reported for 1891, available for special services for 1892	14,534 82	
Total	19,286 76	

SUMMARY.

——		Estimate 1892.	1891.
		$ c.	$ c.
Grand total receipt for year		122,778 32	110,517 12
Of which			
Set aside for contingent fund	$ 5,000 00		
Applicable to scholarships	1,285 00		
Applicable to Medical Faculty fees account	820 00		
Applicable to interest on special funds	4,563 40		
Abnormal and available for special service	19,286 76	30,955 16	
Leaving available for ordinary service		91,823 16	

GENERAL OBSERVATIONS AND COMPARISONS OF ORDINARY INCOME FOR 1891 WITH ESTIMATES FOR 1892.

7. It will be observed that the ordinary revenue for 1891 was		$103,677 83
While the estimate for 1892 is		99,928 16
Showing an apparent diminution of		$3,749 67
And this notwithstanding the following items of increase for 1892 :		
Interest on new sales	$1,582 40	
Allowance for rent by Medical Faculty	1,200 00	
Enhancements on renewable leaseholds	700 00	
		3,482 40
Which would increase the amount of the apparent diminution in other items to		$7,232 07

8. This result may be accounted for partially as follows :

Apparent diminution in receipt for 1892 of gross fees, due partly to suspension of July Matriculation Examination and consequent loss of fees, and partly to abnormal receipt in 1891 of $1,537.20 for fees for previous year	$2,169 89	
Apparent diminution in 1892 of receipt for park rents, due to abnormal receipt in 1891 of	681 47	
Investment during 1891 in construction of Biological Building No. 2 of capital to the amount of $54,076.79, representing for interest at 6 per cent. per annum $3,244.56 ; of which, however, only a part was received during 1891, as the transfer of capital occurred at various times during the year ; but even assuming the whole as a loss for comparative purposes it would reach	3,244 56	
Making a total of		6,095 92
Still leaving an apparent deficiency of..........................		$1,136 15

9. So far as the committee can judge, the remaining apparent deficiency is mainly due to the working of the accounts of the special funds.

10. These funds (which were enormous in 1891, and which, though gradually lessening during 1891 and 1892 as the capitals are applied to their proper objects, are still very large) have been invested to a great extent at rates of interest higher than the bank rate of 4 per cent., partly on mortgages, but mainly in temporary advances to U. C. College during the building of the college, in anticipation of the realization of its endowment.

11. By these means a considerable profit was made in 1891 over the bank interest credited to the funds. The capital being now diminished this source of profit has, of course, diminished proportionately.

12. The committee observe that a large amount of these funds is expected to be paid off during the current year ; and it occurs to them that the resulting further diminution of profit may not have been fully taken into account in the estimate submitted, and that it may be necessary to draw on the sum of $5,000 appropriated to contingent fund in order to meet this diminution. But the committee not having investigated the capital account of the University can do no more than throw out this suggestion.

13. In this connection the committee suggest that it is worthy of consideration whether a plan should not be adopted showing in detail the fluctuations in, and totals of, the liquid capital of the University from year to year, and its condition at the close of each year, commencing at latest in the year 1880, and continuing the account for the future.

DETAILS.

Dealing with the items the following remarks occur :—

(*a*) *Interest on Purchase Moneys.*

14. It will be observed that the item of interest on purchase money is increased by the amount to come in from mortgages on sales in Devonshire Place and the vicinity. It was hoped that this amount would be largely in excess of the figures given ; and some sales are still in progress, which, if completed, will add $45,000 to the liquid capital ; but the further depression in real estate has disappointed expectations, and the University has to deal with reluctant instead of willing purchasers.

Besides, in order to sell Devonshire Place at all, it was necessary to provide for its drainage, paving and water supply, involving a large expenditure of capital to take place during the year. It is not safe, therefore, to calculate on any further increase in the new income from this source for the current year, though the sales of next spring may improve the situation for the year 1892-3.

(*b*) *Interest on Loans and Debentures.*

15. The calculation as to interest on loans and debentures has been based on the assumption that the same rate of interest, without loss either during the intervals of reinvestment or by reason of a lowering in the rate, will be obtained as was exigible on the amounts as invested at 30th June, 1891. But it is obvious that an allowance must be made for these matters, and in respect thereof a reduction of $1,000 from the gross estimate is proposed.

(*c*) *Interest on General Bank Balances, etc.*

16. As already intimated, during the construction of Upper Canada College the Government has availed itself, pending the realization of the endowment of the College, of part of the University funds, allowing interest thereon at 6 per cent. This partly accounts for the large sums appearing to the credit of this account in 1891.

(*d*) *Rents.*

17. The estimate for rents, other than University Park rents, is increased in expectation of an enhancement on a renewable lease falling in during this year. In other respects all the rents are calculated upon the assumption that twelve months rent will be received during the year.

No sum has been estimated as receivable during the current year as allowance for ground rent of the site of the School of Practical Science, though it is expected that the matter will be closed in time to secure some receipt from it before the end of the year.

(*e*) *and* (*v*) *Fees, University and College.*

18. As already intimated, the large receipt of $23,369.89 for 1891, is in part accounted for by the fact that certain junior matriculation fees for the preceding year had not been received in time to appear in the accounts of that year.

19. Following is a detailed comparative statement of the receipts from fees for the last five years, with the Registrar's estimate of the probable receipts for the current year

TABULATED STATEMENT OF FEES RECEIVED.

——	Estimated for 1891-2.	1890-1.	1889-90.	1888-9.	1887-8.	1886-7.
	$	$	$	$	$	$
Lecture Fees in University College....	10,000	9,680	9.600	7,803	6,943	7,115
Examination Fees, Faculty of Arts....	5,500	5,100	3,300	2,926	2,559	2.577
Degree Fees, do	1,300	1,290	1,150	1,000	1,000	950
Matriculation Fees, do	....	....	1,861	1,400	1,224	1,247
Examination Fees, Faculty of Law....	150	150	125	175	480	320
Degree Fees, do	200	220	180	240	240	120
Matriculation Fees, Faculty of Medicine	100	192	250	165	365	190
Examination Fees, do	1,500	1,485	1,300	925	925	575
Degree Fees, do	1,400	1,420	1,200	1,120	1,100	520
Examination and Degree Fees, Dentistry	750	725	955	745	....	....
Degree Fees, Engineering.	....	....	....	20	....	....
Fees for Dispensation, Honor Certificates, etc..........	300	313	300	337	230	174
Totals......	21,200	20,575	20,221	16,856	15,066	13,788

MEDICAL FACULTY FEES.

20. These fees, it will be observed, do not include any of the fees charged by the Medical Faculty for tuition of the medical students, all of which, under the arrangements made on the establishment of that Faculty, go to a special account for, and are devoted to, the service of that Faculty.

21. Surpluses have accrued on the operations of the Medical Faculty in various years as follows :—

1888	$1,785 97
1889	539 25
1890	1,720 72
1891	1,278 02
	$5,323 96

These surpluses have been placed to the credit of a Medical Faculty Surplus Account, on the balances of which interest at 5 per cent. has been allowed.

The amount of principal and interest on this head would be :

Principal	$5,323 96
Interest	351 80
	$5,675 76

EXAMINATION AND DEGREE FEES IN MEDICINE.

22. The Examination Fees and Degree Fees in Medicine have been written to the credit of the same account for 1888, 1889 and 1890, but not for 1891.

23. It seems that during last winter, the Minister of Education, having heard of these credits, had an interview with the Chancellor and Vice-Chancellor, on which occasion he objected to them and pointed out that the amounts should be written back to the credit of the University on the grounds next mentioned.

24. It appears to us that these amounts do properly belong to the general funds of the University. which performs the examinations, pays the expenses, gives the certificates and confers the degrees. The amounts involved are as follows :

1888	$2,390 00
1889	2,210 00
1890	2,342 00
	$6,942 00

To which interest at the same rate, amounting to $720.34, has been added ; in all $7,662.34.

25. It appears, however, that under the arrangements made by the medical faculty, certain professors of that faculty agreed to discharge, and have actually discharged, gratuitously a certain portion of the work of examination, which must otherwise have been discharged at the expense of the University, at a cost according to the rates paid for examinations as reported by the Registrar as follows :

1888	$440 00
1889	500 00
1890	600 00
1891	820 00
Making a total of	$2,360 00

26. It seems reasonable that the amount, which has been saved to the University by this action of the Professors of the Medical Faculty should be devoted to that Faculty ; and we suggest that it should be written to the credit of the Medical Faculty Surplus Account in lieu of the sum now appearing as examination fees, which should be retransferred to the University. Adding the interest as before, the amount will be :

Principal	$2,360 00
Interest	150 60
Total	$2,510 60

27. It also appears (see Report, page 84) that Mr. A. C. McKay was employed temporarily last year at a cost to the Medical Faculty funds of $400, to do work in the Department of Physics, properly University work required under the new curriculum, and it seems reasonable that this sum should be written to the credit of the Medical Faculty Surplus Account.

Results of Suggestions.

28. The addition of these two sums of $2,510 60 and $400 (in all $2,910.60) to the Medical Faculty Surplus Account of $5,675.56, would show a total at the credit of that account of $8,586.16 in lieu of $13,338.10.

29. If our suggestion be carried out the same principle should apply in future, and therefore the item of fees is in the estimate divided, so as to state the portion assigned to the Medical Faculty.

30. If these suggestions be adopted they will result in the transfer of $4,751.94 from the Medical Faculty Surplus Account to the general funds as an abnormal receipt for the current year.

Degrees in Agriculture.

31. It is to be observed that hitherto no fees have been charged for degrees in agriculture, given on the instruction at the government institution at Guelph ; while the University has borne the cost of the examinations for these degrees as follows :

1888	$324 07
1889	314 65
1890	247 00
1891	271 05
Total	$1,156 77

32. It is suggested that, as these examinations, for a very small number of candidates, were undertaken at the request of the Government, they should pay the fees in the past and in the future.

Library Fees.

33. The Committee suggest that on the occupation of the new library building, with its great additional facilities, involving a large additional yearly charge, a small library fee should be charged to all students from all institutions availing themselves of the lectures in any of the Arts courses in the University or University College, the proceeds of which charge should go towards the expenses of the library ; and they recommend that any alterations or regulations needed for the establishment of this charge should be procured.

Fees of Students from the School of Practical Science.

34. There are about 100 students from the School of Practical Science who have been receiving instruction from the University Faculty in Physics, Mathematics, Chemistry and Mineralogy and Geology.

35. By sec. 5, sub-sec. 4, Cap. 230, R.S.O., the lectures of the University faculty, with certain exceptions, are free of charge to all students matriculated in the University who are enrolled in a federating university or in University College or in a federating college, and who enter their names with the Registrar of the University faculty ; but in the case of all other students the Senate shall determine the fees which shall be charged for the several courses of lectures in the University.

36. The Senate has determined that $20 shall be charged for the fees of students attending more than three courses of lectures ; $11 for those attending two or three single courses, and $6 for those attending one single course. It may in this connection be worthy of consideration whether the fees should not be $15 at least for three courses.

37. The students from the School of Practical Science not being matriculated in the University, nor entering their names with the Registrar of the University Faculty, do not come within the above statutory provision for free tuition ; the University reaps no benefit from them by means of examination or degree fees ; the University is put to considerable additional expense in some of the Departments in providing for their tuition ; and they properly should, as but for the provision next mentioned they would, come under the operation of the regulation as to payment of fees.

38. But by the statute of Senate No. 208, of October 18th, 1889, respecting the affiliation of the School of Practical Science, Sec. 2, it is provided that "all regular students of the said School shall enjoy the same exemption from fees as is accorded to students matriculated in the University and exempted from payment of fees under the provisions of R.S.O., 1887, Cap. 230, sec. 5, sub-sec. 4."

39. It thus appears that these students, though in quite a different relation to the University, have been by the affiliating statute placed on the same footing in regard to fees as its own undergraduates.

40. It is suggested that the Government should be asked to make provision for the payment of these fees, and to agree to the necessary regulations in that behalf.

(*k, l, o, p,*) *Building and Insurance Funds.*

41. The interest on the Building Insurance and Grant fund and the like funds of course diminishes as the capital is expended.

(*m, n*) *Library Donation and Insurance Funds* (*Books*).

42. The amount to the credit of the Library Restoration Fund, (Books, Donations) on 19th October, 1891, is	$9,198 79
The chairman of the library committee reports that there is in the hands of the treasurer of that committee	2,530 00
which makes a total of	$11,728 79
available from that Fund.	
Orders for books are outstanding to the amount of $23,000.00	
Some further purchases may be authorized, for which allow $1,000, or in all	24,000 00
Applying the above	11,728 79
a balance of	$12,271 21
remains to be provided temporarily out of the Library Insurance Fund (Books).	
That fund stands at	50,000 00
with accumulated bank interest	2,333 33
In all	$52,333 33
From which deduct the above	12,271 21
There will remain	$40,062 12

It is thought that about 4 months interest may be obtained on the Library Restoration Fund, (Books, Donations) say	$120 00
As to the Library Insurance Fund, (Books), it is suggested that $25,000 at least may soon be dealt with as open to permanent investment, and that interest may be allowed thereon at the increased rate of 5 per cent. from 1st January next making for the full year	1,125 00
It is hoped that bank interest on the balance may reach ..	875 00
Making in all	$2,000 00

In this relation it may be observed that any amounts for binding books required in connection with the restoration will properly form a charge on the restoration funds.

(*w*) *Surplus Income, 1891.*

43. The Bursar reports that owing to an underestimate of revenue and an overestimate of expenditure a surplus of income accrued on the operations of last year amounting to $14,534.82, available for the current year. But the receipt is abnormal, and should, like that from the transferred fees, be devoted to special, rather than to ordinary services.

ESTIMATES OF EXPENDITURE.

44. The committee called for requisitions from the various departments and they transmit with this report the replies which they have received.

45. In dealing with the estimates they have endeavored to allocate the amounts to the appropriate funds ; as far as possible, providing for fixed and ordinary charges out of the ordinary revenue ; and seeking to appropriate to special services, or expenditures of a more lasting nature, and in a few cases to unpaid grants of former years those abnormal receipts which cannot be counted on to recur.

PROPOSED EXPENDITURES OUT OF ABNORMAL REVENUE.

46. The expenditures of this nature recommended are :—

	$ c.	$ c.
Insurance for future years	....	1,600 00
This item, due to the adoption of the three years system, is at present conjectural. The new rate of insurance on the main building is 1 per cent., but it is hoped that on completion improved conditions will result in a reduction of the rate to .70. It is also hoped that a rebate may be obtained on the insurance on the books so soon as they are transferred to the fire-proof stack-room now in process of erection.		
Printing and preparation of last year's Calendar	....	439 80
Chemical Laboratory :—		
Revote of the unexpended balance of an old appropriation for special apparatus	888 82	
Revote of the unexpended balance of an old appropriation for apparatus for examinations	220 00	
		1,108 82
Carried forward	....	3,148 62

PROPOSED EXPENDITURE OUT OF ABNORMAL REVENUE—*Continued.*

		$ c.	$ c.
Brought forward			3,148 62
Physical Department—Workshop fittings		669 00	
" " Laboratory fittings		490 17	
" " Supplementary		55 00	1,214 17
Mineralogical and Geological Laboratory—Apparatus and fittings			1,100 00
Psychological Laboratory—Amount already expended of a former appropriation of $900 for apparatus, taken out of Museum Insurance Fund and to be recouped thereto		454 78	
do Revote of balance of same appropriation		445 22	
do Revote of amount of a former appropriation unexpended to be spent for same purpose		200 00	
do Fittings		351 00	1,451 00
Mathematical Department—Apparatus			750 00
Political Science Department—Class Room Maps			30 00
Classics—Class Room Maps and Books			25 00
English— " " "			19 00
French— " " "			43 90
German— " " "			53 00
Italian and Spanish— " "			22 76
Oriental Languages— " "			23 00
Biological Department, Physiological Branch—Apparatus			800 00
Biological Department—Completion and fittings and furniture and grounds of new building No. 2 (exclusive of Museum fittings, $3,000, to be provided for out of Museum Insurance Funds)			4,001 47
The amount expended out of capital on the new building No. 2 up to 30th June, 1891, was		61,590 49	
The further expenditure to October 23, 1891, is	$4,548 93		
The estimated cost of completion, mainly in fittings, etc., is	5,701 28		
Total for the year		10,250 21	
Making a grand total of		71,840 70	
The expenditure on Biological building No. 1 has been—			
Out of surplus income	$24,965 77		
Out of capital	32,160 77		
In all		57,126 54	
Making a total expenditure, actual and estimated, on both buildings of		128,967 24	
It is proposed that of this expenditure		100,000 00	
should be charged to capital, leaving chargeable to income		28,967 24	
Deducting therefrom the amount already so charged		24,965 77	
there remains to be charged making the proposed grant.		4,001 47	
Total of this class of expenditures			12,681 92

47. From the abnormal receipts	$19,286 76
this total being deducted	12,681 92
there remains a balance of those receipts	$6,604 84
whereout the Committee, much to their regret, are obliged to propose the appropriation of	4,555 44
to meet the expected over-expenditure out of ordinary revenue; leaving an ultimate balance of	$2,049 40

on the operations of the year; a balance only reached by dispensing with the contingent fund in 1890; and in any event not more than adequate to meet unforeseen contingencies of revenue and expenditure.

ORDINARY EXPENDITURE.

48. The Committee concur most heartily in the view of the report that it is inadvisable to create ordinary and permanent charges in excess of the ordinary and permanent revenue; and they have gone to the utmost limit of prudence in their desire to meet the most urgent requirements of the report during the current year. In this connection it is necessary to attend to the future as well as the current charge.

49. It is to be observed that the amounts of money expenditure for maintenance, etc., of the new Main and Biological buildings are necessarily conjectural; and, also, that further expenditures will be occasioned shortly by the occupation of the Library and Chemical buildings.

50. The estimates, in brief, propose to meet all the requirements classed in the first degree of urgency in the Report, including the establishment of the Retirement Fund, with the exception of th Demonstrator in Physics.

51. It is to be observed that, for the bulk of the new salaries and for the payments to the Retirement Fund, only nine months' charge falls on the revenues of this year, and that the adoption of the estimates involves a necessarily increased charge for the succeeding year of $3,150.00, reached thus:—

	$ c.
Professor of Ethics, three months' salary and retiring fund	750 00
Lecturer, Latin, “ “ “ and increase	300 00
“ French, “ “ “ “	300 00
“ German, “ “ “ “	300 00
Demonstrator, Chemistry “ “ “ “	300 00
Librarian, “ “ “ “	400 00
Bursar, three months' retirement fund increase	50 00
Registrar, “ “ “	50 00
Professor Political Science, “ “ “	50 00
Professor Mathematics, “ “ “	50 00
Professor Physics, “ “ “	25 00
Demonstrator Physics, “ “ “	50 00
Professor Chemistry, “ “ “	25 00
Professor Biology, “ “ “	25 00
Lecturer Physiology, “ “ “	50 00
Lecturer Italian and Spanish, “ “ “	50 00
Professor Logic and Metaphysics, “ “ “	50 00
Professor Greek, “ “ “	25 00
Lecturer Greek, “ “ “	50 00
Lecturer Latin, “ “ “	50 00
Professor Orientals, “ “ “	50 00
Professor English, “ “ “	50 00
Lecturer English, “ “ “	50 00
Lecturer French, “ “ “	50 00
	3,150 00

52. It is to be further observed that the Committee have been unable to propose grants for the Demonstrator in Physics, or the officers named in the second order of urgency, or in respect of certain increases and grants contemplated by the Report, and proper to be made at the earliest practicable moment. With reference to the officers named in the second order of urgency it may be convenient here to note that they include a Lecturer in Mathematics, omitted by obvious error in the summary of the Report.

53. These considerations will show in how straightened a condition the University stands for funds; and how important it is to increase its revenue at the earliest moment, and by all practicable means.

54. It is only in reliance on such an increase, to be attained from interest on land sales to be made during this and the next financial year, from rent for the site of the School of Science, from fees, and from the operation of the proposed Provincial guaranty of building debentures, that the Committee venture to propose the creation of the charges involved in the estimate, coupled with a provision that in case in any future year the income of the University and College shall prove inadequate to pay the increases proposed in order to put the retirement fund into immediate operation, in addition to the other sums necessary to the service of the University and College, such increases may be suspended in whole or part for such year to the extent to which the same are applicable to the retirement fund. The committee feel that the best interests of the University imperatively require the earliest and most energetic efforts to enlarge its revenues, which are at this time (owing to the depression in the real estate market of Toronto) quite at a standstill.

SCHEME OF ESTIMATES OF EXPENDITURE AND RECOMMENDATIONS.

55. In the preparation of the estimates of expenditure an effort has been made to systematize and detail the votes, and to give such explanations and comparative information as will show the reason of the grants, and the changes in the scale. But the details and information, on this first occasion, have not been given so fully as may be done in future years, when the labors of the Committee will not involve the inauguration of a new system.

56. It is recommended that the plan now adopted, with such improvements and such further details as experience may indicate, be continued in the future, and the columns showing the increases and diminutions in the votes be added.

57. The estimates being limited to expenditures out of income, the Committee have not, save where necessary in order to deal with income, gone into the expenditure out of the capitals of any of the funds, but they have noted for the information of the authorities the requisitions which have come before them payable out of such capitals.

METHOD OF DEALING WITH APPROPRIATIONS AND EXPENDITURES.

The following recommendations are made:—

58. That no appropriation not expended during any financial year be deemed authority for any expenditure during the next year; and that application must be made for a re-appropriation where required.

59. That full details of all expenditures under general appropriations, as for "Supplies" and so forth, be given in the accounts laid before the authorities.

60. That the accounts of such general appropriations be, as far as possible, subdivided and particularized, so as to admit of scrutiny and comparison.

ESTIMATES SUMMARIES.

61. Annexed hereto are the summaries of the estimates, the details and explanations of which are transmitted with this report.

EDWARD BLAKE,
Chairman.

SUMMARIES OF ESTIMATES.

(1)—Detailed Summary of Salaries, Year 1891-2.

—	Estimate, 1891-2.	Paid, 1890-1.
	$ c.	$ c.
(1) Bursar's office	2,381 25	2,110 50
(2) Library	1,490 00	1,950 00
(3) General as between University and University College	4,670 00	4,146 00
(4) Pensions	1,144 00	1,220 00
(5) University of Toronto, general	1,940 00	1,640 00
(6) Teaching staff, etc., University :		
(*a*) Modern History	2,800 00	2,800 00
(*b*) Political Science	5,650 00	5,500 00
(*c*) Mathematics	3,650 00	3,000 00
(*d*) Physics	6,525 00	5,800 00
(*e*) Chemistry	4,979 00	4,178 00
(*f*) Mineralogy and Geology	3,800 00	3,675 00
(*g*) Biology	6,449 00	6,094 00
(*h*) Italian and Spanish	2,150 00	1,500 00
(*i*) Logic and Metaphysics	3,400 00	3,250 00
(7) Teaching staff, etc., University College :		
(*k*) Ethics	2,500 00	1,250 00
(*l*) Greek	4,825 00	4,850 00
(*m*) Latin	2,750 00	1,750 00
(*n*) Oriental Literature	2,650 00	2,000 00
(*o*) English	4,800 00	4,500 00
(*p*) French	2,750 00	1,875 00
(*q*) German	3,100 00	1,375 00
(8) University College, general	760 00	760 00
Total	75,163 25	65,223 50

(2)—Estimated Expenditure, Year 1891-2.

Summary, including Salaries.

—	Estimate, 1892.			Expenditure, 1891.
	Payable out of interest on special funds, and reserve for scholarships.	Payable out of Abnormal Receipts.	Payable out of Ordinary Revenue.	
	$ c.	$ c.	$ c.	$ c.
1. Salaries and pensions :				
(*a*) Salaries (inclusive of Bursar's office, President's house rent and of Retirement Fund). (For summary of details see previous page)			74,019 25	64,003 50
(*b*) Pensions			1,144 00	1,220 00
2. Bursar's office (exclusive of salaries now appearing in salaries statement) $1,175 00 Of which ¼ to U. C. College 293 75				
Three-quarters to University $881 25			881 25	840 31
3. Expenses *re* investments, etc			800 00	1,055 42
4. Scholarships	1,225 00			1,010 00
5. Examiners			5,949 10	6,766 25
6. Library (exclusive of salaries)			2,600 00	2,633 39
" expenses during restoration	1,000 00			
" temporary salaries during restoration	1,350 00			
7. Telephones			105 00	125 00
8. Insurances			400 00	1,742 46
" (For future years)		1,600 00		
9. Main building :				
Repairs, maintenance of structure, etc., fuel, water and gas (salaries excluded)			2,900 00	2,869 02
10. Grounds (exclusive of salaries)			1,000 00	237 45
11. Chemical Department :				
Materials for lectures			450 00	234 83
Balance of special appropriation for apparatus		888 82		201 50
Special appropriation for examination apparatus		220 00		
12. Biological Department :				
Repairs, maintenance of structure, fuel, water and gas (salaries excluded)			1,380 00	993 09
Laboratory supplies, etc			325 00	217 86
Apparatus for Physiological Branch		800 00		
Museum wing, for completion, including fittings, furnishings, roads, fence, etc		4,001 47		
13. Physical Department :				
Maintenance and Laboratory supplies			300 00	254 52
Fittings for workshop		669 00		
Fittings for Laboratory		490 17		
Further fittings		55 00		
14. Mineralogical and Geological Department :				
Maintenance			100 00	50 27
Apparatus and fittings		1,100 00		
15. Ethnological Museum, sundries			50 00	
Carried forward	3,575 00	9,824 46	92,403 60	84,454 87

(2) ESTIMATED EXPENDITURE, YEAR 1891-2—*Continued.*

	ESTIMATE, 1892.			
	Payable out of interest on special funds, and reserve for scholarships.	Payable out of abnormal receipts.	Payable out of ordinary revenue.	Expenditure, 1891.
	$ c.	$ c.	$ c.	$ c.
Brought forward	3,575 00	9.824 46	92,403 60	84,454 87
16. Psychological Department:				
Maintenance and supplies			300 00	
Fittings		351 00		
Instruments and apparatus (old grant)—recoupment of museum fund out of abnormal receipts $454 78				
Amount unexpended 645 22				
		1,100 00		
17. Stationery, University			680 00	955 40
18. Printing, (University, including calendar for year)			2,570 00	1,838 37
Printing and preparing calendar for last year		439 80		
19. Advertising, University			75 00	140 20
20. Incidentals, University			100 00	100 00
21. Stationery, University College			100 00	258 26
22. Printing, University College			50 00	
23. Advertising, University College			50 00	24 25
24. Incidentals, University College			50 00	36 50
25. Mathematics, apparatus		750 00		
26. Political Science, class room supplies		30 00		
27. Classics, " "		25 00		
28. English, " "		19 00		
29. French, " "		43 90		
30. German, " "		53 00		
31. Italian and Spanish, " "		22 76		
32. Oriental Literature, " "		23 00		
Totals	3,575 00	12,681 92	96,378 60	87,807 85

Total estimated expenditure out of receipts $112,635.52

DETAILED ESTIMATE OF EXPENDITURE, YEAR 1891-2.

SALARIES	Estimated amount year ending 30th June, 1892.	Amount paid year ending 30th June, 1891.
(*Report, page 47.*)		
(1) Bursar's Office :		
Bursar (Retirement Fund increase @ $200, for 9 months $150, all reserved and written to credit of fund.)	$ c.	$ c.
To officer	2,200 00	2,200 00
Reserved for Retirement Fund	150 00	....
Clerk	500 00	400 00
Book-keeper	200 00	130 00
Boy	125 00	84 00
	3,175 00	2,814 00
One-quarter to U. C. College, three-quarters to University.	2,381 25	2,110 50
(2) Library :		
Librarian (salary @ $1,200, for 9 months $900.)		
To officer	851 25	....
Reserved for Retirement Fund	48 75	....
Librarian (acting) salary @ $700 for 6 months	350 00	....
Assistant Librarian (paid as Registrar)	....	....
Student assistant	120 00	112 50
do do	120 00	112 50
Librarian in 1891 (also paid as Lecturer in German)	....	1,000 00
Library Assistant in 1891 (now acting Librarian)	....	700 00
	1,490 00	1,950 00
(3) General as between University and University College :		
President (also paid as Professor of Modern History)	1,400 00	1,400 00
do house rent	800 00	800 00
Janitor	504 00	504 00
do as Sunday Constable (formerly included in "Grounds")	25 00	25 00
Gardener (formerly included in "Grounds")	420 00	420 00
do as Sunday Constable (formerly included in "Grounds")	25 00	25 00
Engineer (with rooms and fuel)	576 00	576 00
Superintendent of Electrical Plant (paid as Mechanical Assistant, Physics).	....	....
Attendant on Lavatory, salary for 8½ months at $26 per month	221 00	84 00
Charwoman (formerly included in "buildings") salary for 37 weeks at $7 per week	259 00	312 00
Charwoman	258 00	....
Fireman, also snow-sweeper and cleaner, salary for 26 weeks at $7 per week	182 00	....
	4,670 00	4,146 00
(4) Pensions :		
J. M. Hirschfelder	1,000 00	1,000 00
George Goodwin	144 00	144 00
B. Fitzpatrick (dead)	....	76 00
	1,144 00	1,220 00
(*Report, page 48.*)		
(5) University of Toronto, General :		
Vice-Chancellor	400 00	400 00
Registrar (also paid as Registrar University College and Secretary to University College Council). (Retirement Fund increase at $200, for 9 months $150, calculated on the whole income)		
To officer	851 25	750 00
Reserved for Retirement Fund	48 75	....
Registrar's Assistant	200 00	200 00
Bedel and Attendant on Senate, (also paid as Bedel University College)	340 00	190 00
Architect	100 00	100 00
	1,940 00	1,640 00

DETAILED ESTIMATE OF EXPENDITURE, YEAR 1891-2.—*Continued.*

SALARIES	Estimated amount year ending 30th June, 1892.	Amount paid year ending 30th June, 1891
(6) Teaching staff, etc., University of Toronto :	$ c.	$ c.
(*a*) Modern History :		
Professor (also paid as President)	2,800 00	2,800 00
	2,800 00	2,800 00
(*b*) Political Science :		
Professor of Political Economy and Constitutional History. (Retirement Fund increase @ $200, for 9 months $150, all reserved and written to credit of fund).		
To officer	3,000 00	3,000 00
Reserved for Retirement Fund	150 00	....
Professor of Constitutional and International Law	1,000 00	1,000 00
Professor of Roman Law, Jurisprudence, and History of English Law	1,000 00	1,000 00
Fellow in Political Science	500 00	500 00
	5,650 00	5,500 00
(*Report, page 49.*)		
(*c*) Mathematics :		
Professor (Retirement Fund increase @ $200, for 9 months $150, all reserved and written to credit of fund).		
To officer	2,500 00	2,500 00
Reserved for Retirement Fund	150 00	....
Fellow	500 00	500 00
Fellow	500 00	....
	3,650 00	3,000 00
(*d*) Physics :		
Professor (Retirement Fund increase @ $100, for 9 months $75, all reserved and written to credit of fund).		
To officer	3,100 00	3,100 00
Reserved for Retirement Fund	75 00	....
Demonstrator (Retirement Fund increase @ $200, for 9 months $150).		
To officer	1,573 13	1,500 00
Reserved for Retirement Fund	76 87	....
Fellow	500 00	500 00
Mechanical Assistant (also Superintendent of Electrical Plant)	800 00	700 00
Temporary Assistant Lecturer (A. C. McKay, Report p. 84, in order to put on proper basis pecuniary relations between Faculties)	400 00	....
	6,525 00	5,800 00
(*e*) Chemistry :		
Professor (Retirement Fund increase @ $100, for 9 months $75, all reserved and written to credit of fund).		
To officer	3,100 00	3,100 00
Reserved for Retirement Fund	75 00	....
Demonstrator, (salary @ $800, for 9 months $600.)		
To officer	570 00	....
Reserved for Retirement Fund	30 00	....
Fellow	500 00	500 00
Lecture Assistant	200 00	200 00
Attendant (9 months in 1890-1)	504 00	378 00
	4,979 00	4,178 00
(*f*) Mineralogy and Geology :		
Professor	3,100 00	3,100 00
Fellow	500 00	500 00
Attendant (part of year in 1891)	200 00	75 00
	3,800 00	3,675 00

DETAILED ESTIMATE OF EXPENDITURE, YEAR 1891-2.—*Continued.*

SALARIES.	Estimated amount year ending 30th June, 1892.	Amount paid year ending 30th June, 1891.
(Report, page 50).		
(*g*) Biology :		
Professor (Retirement Fund increase @ $100, for 9 months $75, all reserved and written to credit of fund).	$ c.	$ c.
To officer	3,100 00	3,100 00
Reserved for Retirement Fund	75 00	....
Lecturer in Physiology (Retirement Fund increase @ $200, for 9 months $150).		
To officer	1,573 13	1,500 00
Reserved for Retirement Fund	76 87	
Fellow	500 00	500 00
Sub-curator of Museum and lecture attendant in Biology	524 00	524 00
Attendant and Caretaker of Biological Buildings (missed 1 week in 1890-1)	480 00	470 00
Wages of boy cleaner	120 00	
	6,449 00	6,094 00
(*h*) Italian and Spanish :		
Lecturer (Retirement Fund increase @ $200, for 9 months $150.)		
To officer	1,573 13	1,500 00
Reserved for Retirement Fund	76 87	....
Fellow	500 00	....
	2,150 00	1,500 00
(*i*) Logic and Metaphysics :		
Professor (Retirement Fund increase @ $200, for 9 months $150, all reserved and written to credit of fund.)		
To officer	3,000 00	3,000 00
Reserved for Retirement Fund	150 00	....
Fellow in Philosophy (half)	250 00	250 00
	3,400 00	3,250 00
(Report, page 51).		
(7) Teaching staff, etc., University College		
(*k*) Ethics :		
Professor (Salary @ $3,000, for nine months $2,250.)		
To officer	2,058 75	....
Reserved for Retirement Fund	191 25	....
Professor, allowance in 1890-91	....	1,000 00
Fellow in Philosophy (half)	250 00	250 00
	2,500 00	1,250 00
(*l*) Greek :		
Professor (Retirement Fund increase @ $100, for 9 months $75, all reserved and written to credit of fund.)		
To officer	3,100 00	3,100 00
Reserved for Retirement Fund	75 00	....
Lecturer in Greek, including Greek History, (Retirement Fund increase @ $200, for 9 months $150.)		
To officer	1,573 13	1,500 00
Reserved for Retirement Fund	76 87	....
Fellow (half Latin in 1891 ; no Fellow in 1892)	....	250 00
	4,825 00	4,850 00
(*m*) Latin :		
Lecturer in Latin, including Roman History, (Retirement Fund increase @ $200, for 9 months $150.)		
To officer	1,573 13	1,500 00
Reserved for Retirement Fund	76 87	....
Lecturer (salary @ $800, for 9 months $600.)		
To officer	570 00	....
Reserved for Retirement Fund	30 00	....
Fellow (half Greek in 1891)	500 00	250 00
	2,750 00	1,750 00

DETAILED ESTIMATE OF EXPENDITURE, YEAR 1891-2.—*Continued.*

SALARIES.	Estimated amount year ending 30th June, 1892.	Amount paid year ending 30th June, 1891.
(Report, page 52).		
(*n*) Oriental Literature :	$ c.	$ c.
Professor (Retirement Fund increase @ $200, for 9 months $150.)		
To officer	2,052 50	2,000 00
Reserved for Retirement Fund	97 50	....
Fellow	500 00	....
	2,650 00	2,000 00
(*o*) English :		
Professor (Retirement Fund increase at $200, for 9 months $150. All reserved and written to credit of fund.)		
To officer	3,000 00	3,000 00
Reserved for Retirement Fund	150 00	....
Lecturer (Retirement Fund increase @ $200, for 9 months $150.)		
To officer	1,573 13	1,500 00
Reserved for Retirement Fund	76 87	....
	4,800 00	4,500 00
(*p*) French :		
Lecturer (Retirement Fund increase @ $200, for 9 months $150.)		
To officer	1,573 13	1,500 00
Reserved for Retirement Fund	76 87	....
Lecturer (Salary @ $800, for 9 months $600.)		
To officer	570 00	....
Reserved for Retirement Fund	30 00	....
Fellow (2 Fellows in 1890-91, each half German, 1 @ $500, ½ = $250 ; 1 for 6 months @ $250, ½ = $125)	500 00	375 00
	2,750 00	1,875 00
(Report, page 53).		
(*q*) German :		
Lecturer (in 1890-91 paid also as Librarian)	2,000 00	1,000 00
Lecturer (salary @ $800, for 9 months $600.)		
To officer	570 00	....
Reserved for Retirement Fund	30 00	....
Fellow (2 Fellows in 1890-91, each half French, 1 @ $500, ½ = $250 ; 1 for 6 months @ $250, ½ = $125)	500 00	375 00
	3,100 00	1,375 00
(8) University College, general :		
Registrar (also paid as Registrar University)	250 00	250 00
Bedel (also paid as Bedel University)	510 00	510 00
	760 00	760 00

DETAILED ESTIMATE OF EXPENDITURE, YEAR 1891-2.—*Continued.*

Expenses.	Estimated Amount for 1891-2.			Amount paid 1890 1.
	Payable out of interest on special funds.	Payable out of abnormal receipt.	Payable out of ordinary revenue.	
	$ c.	$ c.	$ c.	$ c.
(Report, page 12).				
2. Bursar's Office (exclusive of salaries now in salary list.)				
Allowance to cover gas, fuel and attendance			100 00	100 00
Stationery, printing, postage and incidentals			675 00	620 41
Allowance for rent of office			400 00	400 00
			1,175 00	1,120 41
¼ to U. C. College, ¾ to University			881 25	840 31
3. Expenses *re* investments, etc.:				
Law costs			500 00	642 47
General incidentals			300 00	412 85
			800 00	1,055 42
4. Scholarships:				
Junior Matriculation:				
Classics (Mary Mulock Scholarship)	120 00			120 00
General Proficiency (Prince of Wales Scholarship)	50 00			50 00
First year:				
Classics (Moss Scholarship)	120 00			120 00
Political Science (Bankers' Scholarship)	70 00			
Second year:				
Classics (William Mulock Scholarship)	60 00			60 00
Mathematics " "	60 00			60 00
Modern Languages (George Brown Scholarship)	60 00			60 00
Philosophy (John Macdonald Scholarship)	50 00			50 00
Political Science (Blake Scholarship) No. 1	75 00			75 00
" " " No. 2	50 00			50 00
Third year:				
German (Julius Rossin Scholarship)	60 00			60 00
Political Science (Blake Scholarship) No. 1	75 00			75 00
" " " No. 2	50 00			50 00
Physics No. 1	100 00			
" No. 2	45 00			
Chemistry and Mineralogy (Daniel Wilson Scholarship)	60 00			60 00
Natural Sciences " "	60 00			60 00
Post-Graduate:				
Political Economy (Ramsay Scholarship)	60 00			60 00
	1,225 00			1,010 00
5. Examiners:				
Arts			3,000 00	2,998 14
" (supplemental)			1,100 00	585 05
Medicine			700 00	696 97
" (supplemental)			200 00	
Law			140 00	140 60
Engineering			20 00	
Dentistry			310 00	229 50
Agriculture			270 00	271 05
Matriculation (subject to be diminished by refund from Victoria University)			209 10	1,844 94
			5,949 10	6.766 25

DETAILED ESTIMATE OF EXPENDITURE, YEAR 1891-2.—*Continued.*

EXPENSES.	ESTIMATED AMOUNT FOR 1891-2. Payable out of interest on special funds.	Payable out of abnormal receipt.	Payable out of ordinary revenue.	Amount paid 1890-1.
	$ c.	$ c.	$ c.	$ c.
6. Library (exclusive of such of the salaries as are charged in salary list: Customary grant, $2,600.00.				
Periodicals	....	....	800 00	
Books and binding	....	....	1,450 00	
Expenses (ordinary)	....	....	350 00	
" (chargeable to restoration)	1,000 00			
Details of expenses:				
1. Carriage $400 00				
2. Commissions 200 00				
3. Insurance on shipments 200 00				
4. Packing-cases, etc 100 00				
5. Postage-drafts, etc 150 00				
6. Library furnishings 150 00				
7. Office supplies 150 00				
$1,350 00				
Temporary assistance chargeable to restoration:				
Acting Librarian at $300 for 6 months	150 00			
Three women assistants at $260	780 00			
Porter	420 00			
	2,350 00	....	2,600 00	2,633 39
7. Telephones:				
University main building	....	....	30 00	30 00
Biological building	....	....	30 00	45 00
Bursar's office	....	....	45 00	50 00
			105 00	125 00
8. Insurances	....	....	400 00	1,742 46
" (for future years)	....	1,600 00	....	....
9. Main Building: Maintenance of structure (salaries estimated on salary list for 1892—				
Repairs, including carpentry and plumbing, occasional labor, sundries	....	....	700 00	1,095 32
Fuel	....	....	1,800 00	1,423 70
Water	....	....	300 00	261 71
Gas	....	....	100 00	89 29
NOTE—Requisitions have been made by the Faculty to the Board for $4,028.22 for furniture and fittings for the restored main building, but this amount being payable out of furniture insurance fund (capital) is not estimated for here.			2,900 00	2,870 02
10. Grounds: (Salaries estimated on salary list for 1892)— Occasional labor, roads, fences, sidewalks, etc	....	....	1,000 00	237 45
11. Chemical Department:				
Maintenance:				
Chemicals, etc	....	....	200 00	231 83
" to bring stock up to normal quantity	....	....	100 00	
Material other than chemicals	....	....	25 00	
Glass apparatus used in lectures	....	....	100 00	
Repairs	....	....	25 00	
Special for apparatus (revote of grant)	....	888 82		
Special appropriation for examination apparatus	....	220 00		
		1,108 82	450 00	234 83

DETAILED ESTIMATE OF EXPENDITURE, YEAR 1891-2.—*Continued.*

Expenses.		Estimated Amount for 1891-2. Payable out of abnormal receipt.	Estimated Amount for 1891-2. Payable out of ordinary revenue.	Amount paid 1890-1.
		$ c.	$ c.	$ c.
12. Biological Buildings: Maintenance of structure—				
Repairs, including carpentry and plumbing			100 00	231 27
Additional cleaning assistance (exclusive of mineralogical and anatomical rooms)			100 00	
Fuel			750 00	504 62
Water			280 00	143 29
Gas			150 00	113 91
			1,380 00	993 09
Biological Department:				
Laboratory, lecture-room and museum supplies			250 00	110 90
House furnishing and stationery			75 00	106 96
			325 00	217 86
Apparatus for Physiological branch		800 00		
Museum Wing or Biological Building No. 2:				
The expenditure for the year up to Oct. 23rd, 1891, is	$4,548 93			
The estimated cost of completion is as follows:				
On account of estimates for fittings, furnishings, (Mr. Dick's estimate of 20th Aug., 1891)	3,455 28			
Add extra cost of seats	180 00			
Prof. Wright's statement of 1st Sept., 1891, (see his letter for details)	720 00			
Electric wiring	146 00			
Sundries (unforeseen)	200 00			
Grounds, fencing and sidewalks:				
Mr. Dick's estimate of Sept. 3rd, 1891 .... $2,261 00				
Suggested to omit wrought iron fence, $600, to postpone of painting, $200, work being done by the servants in the summer, to reduce items for road-making, grading and sodding (part of cost of which may be accomplished by the use of contractor's refuse and part at a cheaper rate by the University itself) by $461; total 1,261 00				
And to submit a vote for the balance	1,000 00			
Total expenditure for the year	$10,250 21			
Of which it is proposed to charge to capital account (see sec. 46)	6,248 74	4,001 47		
		4,801 47		
Leaving chargeable to abnormal receipt				

NOTE No. 1.—By arrangement stated in the Report a portion of the charge for maintenance and repairs is to be borne out of Medical Faculty Funds. This proportion, however, can be ascertained only after the experience of the year.

NOTE No. 2.—$3,000 is required for fittings for the Museum. But as the amount is properly payable out of the capital of the Museum Insurance Funds it is not estimated for here.

DETAILED ESTIMATE OF EXPENDITURE, YEAR 1891-2—*Continued.*

Expenses.		Estimated Amount for 1891-2.		Amount paid 1891-2.
		Payable out of abnormal receipts.	Payable out of ordinary revenue.	
		$ c.	$ c.	$ c.
13. Physical Department:				
Maintenance—				
Chemicals (acids, alcohol, turpentine, etc.)	$40 00			
Electrical supplies (wire, etc.)	35 00			
Glass and rubber tubing	25 00			
Stationery, drawing paper, mimeograph, etc	25 00			
Dry goods for covers, dusters, etc	10 00			
Materials for making and repairing instruments: Iron castings, $25.00; brass castings, $25.00; sheet and bar metals, $20.00; bolts, screws, etc., $15.00; chuck, $15.00	100 00			
Wood, $20.00; screws, nails, etc., $10.00	30 00			
Freight, $25.00; sundries, $10.00	35 00			
			300 00	254 52
Fittings for workshop, authorized by Board of Trustees 3rd September, 1891 (see papers for details)		669 00		
Fittings for laboratory as per requisition of Faculty, 12th October, 1891 (see papers for details)		490 17		
Supplementary estimate—				
Laboratory shades		30 00		
Instrument case		25 00		
		1,214 17	300 00	254 52
14. Mineralogical and Geological Department:				
Supplies and sundries		....	100 00	50 27
Fittings for students' use on occasion of removal to Biological buildings, as per architect's estimate		700 00		
Sink in basement		50 00		
New instruments		350 00		
		1,100 00	100 00	50 27
NOTE.—$250 is required for additional specimens for geological work, but as the amount is properly payable out of the capital of the museum insurance fund it is not estimated for here.				
15. Ethnological Museum:				
Sundries		....	50 00	
NOTE.—$1,280 is required for fittings and cases for the Museum, but as the amount is properly payable out of the capital of the museum insurance fund it is not estimated for here.				

DETAILED ESTIMATE OF EXPENDITURE, YEAR 1891-2—*Continued.*

EXPENSES.	ESTIMATED AMOUNT FOR 1891-2.		Amount paid 1891-2.
	Payable out of abnormal receipts.	Payable out of ordinary revenue.	
	$ c.	$ c.	$ c.
16. Psychological Department :			
Maintenance—			
Assistance in demonstration and preparation of lectures(occasional)	....	100 00	
Repairs and new apparatus	....	150 00	
New books, charts, models, paper, postage and incidentals	....	50 00	
Fittings in laboratory, including work tables, bookcase, model case, instrument holders, etc.	351 00		
Instruments and apparatus, estimated for last year. Amount paid out of museum insurance fund, to be recouped out of abnormal receipt $454 78			
Re-vote of amount unexpended, payable this year out of abnormal receipt 645 22	1,100 00		
NOTE.—$40 required for blackboard is not estimated, because properly payable out of building restoration fund (capital).	1,451 00	300 00	
17. Stationery (University) :			
Office supplies, paper for examinations, postage, etc.	....	680 00	955 40
18. Printing (University) :			
Including an estimate of $400 for calendar	....	2,570 00	1,838 37
Calendar for 1891, including allowance for preparation..................	439 80		
19. Advertising (University)	....	75 00	140 20
20. Incidentals (University)...........	....	100 00	100 00
21. Stationery (University College)..................	. .....	100 00	258 26
22. Printing (University College) including extracts from University calendar.	....	50 00	
23. Advertising (University College)	....	50 00	24 25
24. Incidentals (University College).........	....	50 00	36 50

DETAILED ESTIMATE OF EXPENDITURE, YEAR 1891 2.—*Continued.*

EXPENSES.	Estimated amount 1891-2. Payable out of abnormal receipts.	Amount paid. 1890-1.
	$ c.	$ c.
25. Mathematics—		
Models for teaching intermediate and higher geometry	750 00	
26. Political Science—		
Maps	30 00	
27. Classics—		
Maps	25 00	
28. English—		
Maps	6 00	
Large model of larynx	12 00	
Pasteboard cartoons	1 00	
	19 00	
29. French—		
Maps	8 00	
Books for class-room use	35 90	
	43 90	
30. German—		
Maps	10 00	
Books for Class-room use	43 00	
	53 00	
31. Italian and Spanish—		
Maps	8 00	
Books for class-room use	14 76	
	22 76	
32. Oriental Literature—		
Maps	23 00	

120 Simcoe Street, 30th October, 1891, Toronto.

H. H. Langton, Esq.,
Registrar, University of Toronto.

Dear Sir,—At a meeting of the Board of Trustees held yesterday, your letter conveying the draft Report of the Committee of the Senate on Finance, containing estimates of revenue and expenditure, and their observations on various matters, was read, together with the Report referred to, and the following minute made:—

"Moved by Dr. Hoskin, seconded by Mr. Christie, and

"*Resolved*, that the Board approves of the Report of the Finance Committee of the University of Toronto."

Yours truly,

J. E. BERKELEY SMITH,
Bursar.

REPORT

OF

THE HON. THE PROVINCIAL TREASURER

ON THE WORKING OF THE

TAVERN AND SHOP LICENSES ACTS

FOR THE YEAR

1891.

PRINTED BY ORDER OF THE LEGISLATIVE ASSEMBLY.

TORONTO.
PRINTED BY WARWICK & SONS, 68 AND 70 FRONT STREET WEST
1892.

CONTENTS.

	Page
Preface	v.
Schedude A.—Shewing the Licenses issued, extended, transferred or removed, and the Revenue received by the Province therefrom in 1888-9, 1889-90 and 1890-1 (by Districts)	2
Schedule B.—Comparative Statement of the number of Licenses issued from 1874 to 1890 inclusive (by Counties, and Cities separated from Counties)	6
Schedule C.—Statement in detail of Licenses issued, extended, transferred or removed in the Municipalities, and the amount paid to such Municipalities during 1888-9, 1889-90 and 1890-1 (by Cities, Towns, Townships and Incorporated Villages)	20
Schedule D.—Amount of Fines collected, and the amounts paid for expenses of Commissioners and Salaries of Inspectors in 1888-9, 1889-90 and 1890-1	86
Schedule E.—Statement of Sundry Expenses	88
Recapitulation of Receipts and Expenditures	89
Schedule F. Comparative Statement of Commitments for Drunkenness in the County Gaols, from 1876 to 1891 inclusive	90
Schedule G.—Names and post office addresses of Inspectors of Licenses	91

LICENSE REPORT.

Provincial Treasurer's Office,
License Bbanch,
Toronto, January, 1892.

To the Honourable Alexander Campbell. K.C.M.G.,
Lieutenant-Governor of the Province of Ontario.

May it Please Your Honour :

I have the honour to submit the Sixteenth Annual Report, and accompanying Schedules, respecting the operation of the Liquor License Laws.

Number of Licenses.

Schedule A is a comparative statement of the number of Licenses of the various denominations issued, and of the number extended, transferred or removed in each of the License Districts of the Province, during the past three license years, and may be thus summarized :

YEARS.	LICENSES.									Extensions, Transfers, and Removals of Licenses.			
	Tavern.						Vessel.						
	Yearly.		Six Months.										
	Ordinary.	Beer and Wine.	Ordinary.	Beer and Wine.	Shop.	Wholesale.	Ordinary.	Beer and Wine.	Total.	Extensions.	Transfers.	Removals.	Total.
1888-9	2019	47	34	6	336	26	9	8	2485	46	365	39	449
1889-90	2992	81	40	9	445	27	8	7	3609	46	534	56	636
1890-91	3005	66	15	10	428	24	....	.....	3548	51	574	53	678

PROVINCIAL REVENUE.

The same Schedule shews the revenue derived by the Province from Licenses and Fines to have been for

1888-9	$232,511 55
1889-90	307,281 02
1890-91	308,200 17

LICENSES IN COUNTIES AND CITIES.

Schedule B is a statement of the number of Licenses issued in the several Counties and Cities during the past sixteen years.

LICENSES IN MINOR MUNICIPALITIES.

Schedule C gives, in detail, as regards each City, Town, Incorporated Village, and Township, and the Unorganized Territory of the Province, the number of Licenses (other than Vessel Licenses) and of extensions, transfers and removals granted during the past three years.

TOTAL COLLECTIONS.

This Schedule also gives the amounts collected on account of Licenses and Fines (including the sums imposed by municipal by-laws), the totals of which (with the duties derived from Vessel Licenses during the years 1888-9 and 1889-90) were as follows:—

1888-9	$470,855 50
1889-90	680,560 55
1890-91	680,298 68

MUNICIPAL REVENUE.

The payments to the Municipalities are shewn by the same Schedule to have been in—

1888-9	$190,297 79
1889-90	297,353 45
1890-91	294,968 26

FINES.

The fines collected during the past year, as shewn by Schedule D, amounted to $22,572.07 as compared with $21,073.20 in 1889-90.

SALARIES OF INSPECTORS—EXPENSES OF COMMISSIONERS.

The payments under these heads are also shewn in the same Schedule D.

MISCELLANEOUS EXPENDITURE.

Schedule "E" shews the expenditures of enforcing the Act in the several districts other than those included in Schedule D, and consists of postage, stationery, printing advertising, magistrates, constables, witness, counsel and detective fees, etc.

COMMITMENTS FOR DRUNKENNESS.

Schedule F shews the number of prisoners committed for drunkenness during the years from 1876 to 1891 inclusive. The number committed during the year 1891 as compared with 1890 shows a decrease of 959.

THE INSPECTORS OF LICENSES.

The names and post office addresses of the Inspectors of Licenses are set out in Schedule G.

SPECIAL INSPECTION OF LICENSE DISTRICTS.

The Special inspections of the License Districts, and the examination of the work of the license officials therein, from time to time, have been continued during the past year.

Respectfully submitted.

R. HARCOURT,
Provincial Treasurer.

SCHEDULES.

SCHEDULE A.

COMPARATIVE STATEMENT, BY LICENSE DISTRICTS, shewing the number of (Provincial) such licenses extended, transferred or removed, and the amount of revenue license years 1888-9, 1889 90

License District.	Tavern Licenses Issued.												Tavern Licenses Extended.			Shop Licenses Issued.			Shop Licenses Extended.		
	Yearly Licenses.						Six Months Licenses.														
	Ordinary.			Beer and Wine.			Ordinary.			Beer and Wine.											
	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.
Addington		37	33																		
Aigoma	22	28	31				3									5	5	5			
Brant, North		17	17														2	2			
Brant, South		9	9																		
Brantford	18	18	18													5	5	5			
Brockville and Leeds		40	38		1	1		3	3		1	1					10	7			
Bruce, Centre	26	28	26				1									3	3	3			
Bruce, North	32	31	30																		
Bruce, South	38	43	42	1												3	3	3			
Cardwell	39	40	38				3	1	1						2	2	2	2			
Carleton		26	26														1	1			
Cornwall	23	26	26	1	1	1										3	4	3			
Dufferin	24	27	26													2	2	2			
Dundas	25	26	19														1	1			
Durham, East		23	21														1	1			
Durham, West		12	11		1	1			1						1		3	3			
Elgin, East		25	25		4	1		1	2						1		1	1			
Elgin, West		39	36												2		7	4			2
Essex, North	50	55	61		1	1	2	2	2				3	1	1	8	10	8			
Essex, South	31	38	31	1	1	1	2		2						2	2	2				
Frontenac		22	23		1	2					1	1									
Glengarry	29	32	31						1					3		4	4	4			
Grenville		32	31												2		3	3			
Grey, Centre	27	27	25	2	1	2										1	1	1			
Grey, North	25	25	23	3	1	1	1	1								3	3	3			
Grey, South	27	30	30													3	2	2	1		
Haldimand	32	31	36	2	3	2	1									2	2	2			
Haliburton	6	7	7																		
Halton	28	28	27																		
Hamilton	109	90	92	2				1	1		1			19	4	37	38	38			
Hastings, East	28	29	28										1			3	3	3			
Hastings, North	25	28	29	2		1										4	4	3			
Hastings, West	41	41	41										5		1	6	5	5			
Huron, East	26	26	24																		
Huron, South	41	39	39		3		1		1							6	5	4			
Huron, West	41	41	40							1	1					5	3	2			
Kent, East		34	32														1	1			
Kent, West		38	43												1		5	5			
Kingston	43	39	38	1	1							2		2		15	15	15	1		
Lambton, East		25	23									1					4	4			
Lambton, West		39	45		1	2			1								5	6			
Lanark, North		20	26														2	3			
Lanark, South		19	19														4	4			
Lennox		15	16					1						1			3	2			1
Lincoln		28	30		4	1		2	2								3	3			
London	51	52	54	6	6	2									2 & 2 B. & W.	14	13	12			1
Manitoulin	13	17	17														2	1			

* One wholesale

SCHEDULE A.

Tavern, Shop, Wholesale, Six Months' and Vessel Licenses issued, and the number of received by the Province therefrom, including the proportion of Fines, in the and 1890-1 respectively.

Wholesale Licenses Issued.			Vessel Licenses Issued. Ordinary.			Vessel Licenses Issued. Beer and Wine.			Licenses Transferred and Removed. Transfers.			Licenses Transferred and Removed. Removals.			Totals.			Proportion of Duties for Provincial Licenses Fees for Transfers and Removals, and Fines received by the Province.			REMARKS.
1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	
																		$ c.	$ c.	$ c.	
..	..	..	..	..	..	..	..	..	....	6	6	.	..	1	....	43	40	... .	1633 02	1570 84	
..	..	..	..	..	..	..	..	..	4	5	4	.	..	..	31	38	40	2182 46	2514 50	2724 02	
..	..	..	..	..	..	..	..	..	....	2	2	..	..	..	....	21	21	....	1193 33	1230 03	
..	..	..	..	..	..	..	..	..	....	3	3	..	..	..	....	12	12	....	270 00	286 73	
3	3	2	..	..	..	..	..	..	5	6	6	..	..	1	31	32	32	3321 79	3320 48	3144 67	
..	.	.	..	..	..	..	..	..	....	1	2	..	..	..	....	56	52	....	3320 45	5151 08	
..	..	..	..	..	..	..	..	..	4	6	4	..	..	1	34	37	34	2043 43	2060 33	1906 67	
..	..	..	..	..	..	..	..	..	7	12	13	..	..	.	39	43	43	2046 63	1880 00	1850 17	
..	..	..	..	..	..	..	..	..	12	19	6	1	..	1	55	65	52	2515 63	2918 23	2796 49	
..	..	..	..	..	..	..	..	..	3	9	6	1	.	1	48	52	50	2472 93	2375 65	2299 87	
..	..	..	..	..	..	..	..	..	....	..	7	..	1	..	....	28	34	....	1197 85	1269 44	
..	..	..	..	..	..	..	..	..	1	5	2	2	..	..	30	36	32	1919 94	2113 86	2030 55	
..	..	..	..	..	..	..	..	..	5	12	8	..	.	..	31	41	36	1806 03	1868 56	1798 75	
..	..	..	..	..	..	..	..	..	2	4	1	..	..	1	27	31	22	1422 88	1485 06	1305 22	
..	..	..	..	..	..	..	..	..	....	2	1	..	..	..	....	26	23	....	2220 95	2145 36	
..	..	..	..	..	..	..	..	..	....	8	2	..	1	..	....	25	19	....	887 69	964 12	
..	..	..	..	..	..	..	..	..	...	4	7	..	1	..	....	36	37	....	1749 12	1582 64	
..	..	.	..	..	..	..	..	..	....	6	7	.	3	1	....	55	52	....	4486 33	3764 81	
..	.	..	..	..	..	..	..	..	7	14	11	..	..	..	70	83	84	4355 54	4838 04	5045 45	
..	..	..	..	..	..	..	..	..	8	4	3	..	..	1	44	45	40	2219 12	2535 64	2361 34	
..	..	..	..	..	..	..	..	..	....	2	5	..	..	..	....	26	31	....	1032 48	1072 95	
..	..	..	.	..	..	..	..	..	1	3	2	1	..	..	35	42	38	1676 54	1919 50	1847 78	
.	..	..	..	..	..	..	..	.	....	4	2	..	.	..	....	39	38	....	2438 23	2337 95	
..	..	.	.	..	..	..	..	..	5	5	3	..	1		35	35	31	1550 67	1484 75	1363 85	
..	..	..	..	..	.	4	1	..	3	4	4	..	..	..	39	35	31	2662 34	2417 64	2212 76	
..	..	..	..	..	..	..	..	.	2	2	....	..	..	..	33	34	32	1747 29	1816 93	1808 67	
..	..	..	..	..	..	..	..	..	5	1	5	..	..	.	42	37	45	2043 25	1903 25	2264 46	
..	..	.	..	..	..	..	..	..	2	1	2	..		..	8	8	9	243 50	301 64	286 86	
..	..	..	..	..	..	..	..	..	6	3	2	.	..	..	34	31	29	1841 64	1936 46	1837 72	
*2	3	3	..	.	..	..	..	..	44	23	21	7	4	9	202	179	168	27432 34	25051 38	24555 72	
..	..	..	..	..	..	..	..	..	5	3	5	..	..	..	37	35	36	1562 11	1785 77	1684 21	
..	..	.	..	..	..	..	..	..	8	3	6		.	.	39	35	39	1554 81	1671 70	1674 75	
3	2	2	.	..	..	..	..	..	12	14	9	2	1	1	69	63	59	5637 41	5209 35	5196 99	
..	..	..	..	..	..	..	..	..	3	3	6	..	2	2	29	31	32	1257 10	1300 9	1162 12	
..	..	..	..	..	..	..	..	..	9	7	9	1	..	..	58	54	53	2932 41	2839 71	2734 25	
..	..	..	..	..	..	..	..	..	10	3	8	..	..	..	57	48	50	3597 76	3346 03	3202 63	
..	..	..	..	..	..	..	.	.	....	5	6	..	..	2	....	40	41	....	2482 47	2264 29	
..	..	..	..	..	..	..	..	..	....	6	13	..	..	..	....	49	62	....	5001 05	5578 38	
1	1	1	5	4	..	2	3	..	1	3	7	..	1	..	69	69	63	8911 77	8526 18	7358 20	
..	..	..	..	..	..	..	..	..	....	4	3	..	..	..	....	33	31	....	2066 42	1975 94	
..	..	..	..	..	..	..	..	..	....	4	12	..	..	..	....	49	66	....	3219 84	3731 81	
..	..	..	..	..	..	..	..	..	....	....	....	..	..	..	....	22	29	....	1517 07	2107 07	
..	..	..	..	..	..	..	..	..	....	4	5	..	.	..	....	27	28	....	1828 86	1862 47	
..	..	..	..	..	..	..	..	..	....	5	3	..	.	..	....	25	22	....	1330 27	1299 21	
..	..	..	..	..	..	..	..	..	....	8	4	..	2	..	....	47	40	....	2417 10	2476 72	
1	1	1	..	..	..	..	..	..	5	9	9	2	1	1	79	82	84	12373 40	12280 10	12504 28	
..	..	..	..		..	..	..	..	3	....	2	..	..	..	16	19	20	596 98	949 85	1256 68	

license extended.

SCHEDULE A.—Comparative Statement shewing the number of (Provincial)

LICENSE DISTRICT.	Tavern Licenses Issued.																				
	Yearly Licenses.						Six Months' Licenses.						Tavern Licenses Extended.			Shop Licenses Issued.			Shop Licenses Extended.		
	Ordinary.			Beer and Wine.			Ordinary.			Beer and Wine.											
	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.
Middlesex, East		24	33		3	5															
Middlesex, North		22	25		5	3											5	5			
Middlesex, West		25	26		3	1											3	1			
Monck	9	15	12	2	5	7	1	1	1	1						2	1	1			
Muskoka	8	15	15	1	4	6	3	3	3	3	3	1				1	2	1			
Nipissing	23	23	27											1		4	4	4			1
Norfolk, North	17	18	20	3	3	2										3	3	2			
Norfolk, South	14	17	15	3	5	2	1			1	1	1				1					
Northumberland, East		20	20					1	1						1		6	5			
Northumberland, West		24	21		1			2	4						2		4	4			
Ontario, North		24	25		5	3		1	1								5	5			
Ontario, South		35	34												2		2	2			
Ottawa	76	80	88				1	1					1			54	56	59		4	
Oxford, North		28	31														3	3			
Oxford, South		24	27												1		3	4			
Parry Sound	23	25	26		1		1	1	1												
Peel	44	42	43	3	1	1								2		3	3	3	1		
Perth, North	58	58	57	1	1	1							1			5	5	5			
Perth, South	37	31	35												1	5	4	4			
Peterborough, East		15	15		1	1											2	2			
Peterborough, West		26	27		1			1	1								8	9			
Prescott	44	42	43				2	1	2					2		1	1	2			
Prince Edward	16	15	16	2	1	2	2	1	1				1			2	2	2			
Rainy River	11	12	11													3	3	3			
Renfrew, North	22	23	24													3	5	5			
Renfrew, South	33	31	32		1										1	9	11	11			
Russell	32	52	53																		
St Catharines	22	23	23	4	3	3	1	1	1							7	6	5		1	
Simcoe, Centre	22	22	22	1				2	1							4	4	3			
Simcoe, East	32	32	32					1	1							4	5	6			
Simcoe, West	36	39	39											1		7	7	6			
Stormont	27	26	26													1	1				
Thunder Bay	37	33	34			1	1		2						4	8	7	6			
Toronto	150	152	150				1	1	1				15	2	2	50	50	50	4	6	1
Victoria, East		18	19					1	1						1						
Victoria, West		28	25												3		2	2			
Waterloo, North	47	47	47													5	5	5			
Waterloo, South	43	44	45													4	5	5			
Welland	66	68	68	2	2	2	6	9	6		1	1	4			8	9	9	1		
Wellington, East		29	30														2	2			
Wellington, South		31	31														2	2			
Wellington, West		34	32												1		3	2			
Wentworth, North	25	26	25	2	2	2							1			2	2	2			
Wentworth, South	20	21	22									1	3			2	1	2			
York, East	30	30	29					1				1		1		1					
York, North	41	41	40	2	4	5		2							1	1	1	2			
York, West	34	37	34										1		4				1		
Totals	2019	2992	3005	17	81	66	34	10	15	6	9	10	36	35	45	336	445	428	9	11	6

Algoma and Manitoulin divided in 1888-9.

Tavern, Shop, Wholesale, Six Months' and Vessel Licenses, etc.—*Continued.*

Wholesale Licenses Issued.			Vessel Licenses Issued.						Licenses Transferred and Removed.						Totals.			Proportion of Duties for Provincial Licenses, Fees for Transfers and Removals, and Fines Received by the Province.			REMARKS.
			Ordinary.			Beer and Wine.			Transfers.			Removals.									
1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	
																		$ c.	$ c.	$ c.	
..	..	..	..	..	..	..	..	..	..	2	4	..		..	....	29	42	....	1142 89	1553 83	
..	..	..	..	..	..	..	..	..	....	5	2	..		..	....	37	35	....	1826 97	1937 08	
..	..	..	..	..	..	..	..	..	....	4	3	..	..	1	.	35	32	....	1941 36	1835 99	
..	..	..	..	..	..	..	..	..	1	5	4	..		.	16	25	25	749 17	881 01	830 67	
..	..	..	..	..	..	..	..	..	1	2	5	..		..	17	29	31	945 82	1380 43	1391 84	
..	..	..	..	..	..	..	..	..	2	....	3	..	..	..	29	28	35	1241 92	1279 24	1510 00	
..	..	..	..	..	..	..	..	..	4	6	8	.	1	.	27	31	32	1487 42	1552 07	1502 49	
..	..	..	..	..	..	..	..	..	4	2	3	..	.	..	24	23	21	841 27	861 90	791 88	
..	..	..	..	..	..	..	..	..	....	2	1	..	.	..	....	29	28	....	1673 55	1653 63	
..	..	..	..	..	..	..	..	..	...	4	....	..		..	....	35	31	....	2114 50	1924 76	
..	..	..	..	..	..	..	..	..	....	5	8	..	..	..	....	40	42	....	1765 66	1851 94	
..	..	..	..	..	..	..	..	..	....	3	4	..		..	...	40	42	...	2538 69	2454 75	
2	1	2	..	..	..	1	1	..	14	12	24	2	12	10	151	167	183	24280 41	25347 69	27092 07	
..	1	1	.	.	.	..	..	..	....	9	8	..	..	1	....	41	44	....	2314 45	2645 89	
..	..	..	..	..	..	..	..	..	....	5	5	.	1	..	....	33	37	....	1934 17	2266 09	
..	..	..	..	..	..	..	..	..	4	2	6	..	1	1	28	30	34	1289 31	1410 71	1599 49	
..	..	..	..	..	..	..	..	.	10	7	8		.	..	61	55	55	2693 91	2632 38	2565 68	
..	..	..	..	..	..	..	..	..	12	6	13	1	..	1	78	70	77	5541 61	5545 98	5582 61	
..	..	..	..	..	..	..	..	..	4	8	9	..		..	46	48	49	2735 13	2678 57	2647 00	
..	..	..	..	..	..	..	..	..	....	3	3		..	..	....	21	19	....	893 77	815 25	
..	..	..	..	..	..	..	1	..	..	2	9	..	..	..	....	39	46	....	3112 87	3280 10	
..	..	.	..	..	..	..	..	..	7	8	8	1	..	.	55	54	55	2371 55	2280 53	2316 03	
..	..	.	2	2	.	..	..	..	2	3	7	..	..	..	27	24	28	1471 58	1484 94	1216 78	
1	*	..	..	..	..	..	..	..	1	3	1	..	..	..	16	19	15	883 48	720 72	972 45	
..	..	..	..	..	..	..	..	..	....	1	1	.	..	..	25	29	30	1652 78	1808 34	1922 78	
..	..	..	..	..	..	..	..	..	6	8	6	..	1	2	48	52	52	2476 90	2553 49	2679 96	
..	..	..	..	..	..	..	..	..	4	7	16	..	..	1	36	59	70	1569 93	2565 35	2744 21	
..	..	..	..	..	..	..	..	.	2	2	6	..	1	1	36	37	39	2942 61	3901 73	3725 57	
..	..	..	..	..	..	..	..	..	7	8	2			..	34	36	28	1771 43	1762 96	1616 78	
..	..	..	..	..	..	..	..	..	7	5	11	1	1	1	44	44	51	2664 67	2647 41	2743 18	
.	..	..	..	..	..	..	..	..	7	7	8	..		.	50	54	53	2857 27	3206 96	3242 47	
..	..	..	..	..	..	..	..	..	6	4	5	1	..	1	35	31	32	1209 90	1154 87	1073 77	
..	..	..	..	..	..	..	..	..	4	2	4		1	1	50	43	52	3522 68	3026 38	3151 60	
12	14	11	2	2		1	1	..	27	34	39	11	15	6	273	277	269	39024 00	39493 49	37509 77	
..	..	..	..	..	..	..	..	..	..	6	6	..	3	..	....	28	27	....	1125 21	1215 07	
..	..	..	..	..	..	..	..	..	....	8	3	..	1	1	....	39	34	....	2166 67	1911 28	
1	1	1	..	..	..	..	..	..	6	4	5	..	..	..	59	57	58	3732 94	3687 18	3741 05	
..	..	..	..	..	..	..	..	..	....	....	1	.	.	..	47	49	51	3135 31	3271 92	3361 59	
..	..	..	..	..	..	..	..	..	16	17	17	3	.	1	106	106	104	5637 87	5838 32	5853 23	
..	..	..	..	..	..	..	..	..	....	5	2	..	.	..	....	36	34	....	2104 31	2145 78	
..	..	..	..	..	..	..	..	..	....	8	8	..	.	..	....	41	41	....	2942 19	2949 11	
..	..	..	..	..	..	..	..	..	....	11	8	..	.	..	....	48	43	... ..	2576 52	2438 23	
..	..	..	..	..	..	..	..	..	4	4	7	..	..		34	34	36	1675 97	1689 62	1670 22	
..	.	..	..	.		..	..	..	6	7	2	2	..	1	33	29	28	1013 23	980 58	1055 70	
..	..	..	..	..	..	..	..	..	6	4	3	..	..	..	37	36	33	1578 87	1617 90	1552 47	
..	..	..	..	..	..	..	..	.	6	11	7	..	.	..	50	57	55	2647 85	2649 25	2724 87	
..	..	..	..	..	..	..	..	..	3	6	7	..		..	39	43	45	1914 07	2181 35	2106 21	
26	27	24	9	8	.	8	7	.	365	534	574	39	56	53	2935	4246	4256	232511 55	307281 02	308260 17	

*Wholesale extended.

SCHEDULE B.

COMPARATIVE STATEMENT, by COUNTIES AND CITIES, showing the number of (Provincial) Tavern, Shop, Wholesale and Vessel Licenses issued in the several Counties of the Province, and the Cities separated from Counties, for the license years 1874-5-6-7-8-9-80-1-2-3-4-5-6-7-8-9-90.

COUNTY.	Year.	Tavern Licenses.	Shop Licenses.	Wholesale Licenses.	Vessel Licenses.	REMARKS.
Algoma (including Thunder Bay	1874	30	14	....	3	
	1875	36	15	....	3	
	1876	18	6			
	1877	19	5			
	1878	19	5			
	1879	21	8	1		
	1880	22	6	1		
	1881	29	9	1		
	1882	35	9	1		
	1883	56	6	1		
	1884	74	12	2		
	1885	58	12	1		
	1886	62	16	1		
	1887	70	9	1	....	The licenses issued in Rainy River in 1887 are not included in this schedule, there were 8 tavern, 2 shop, and 1 wholesale.
	1888	83	16	1		
	1889	90	17			
	1890	94	15			
Brant (not including City of Brantford)...........	1874	95	29			
	1875	73	22	2		
	1876	56	14	4		
	1877	....	....	7	....	Dunkin Act in force.
	1878	53	11	5		
	1879	55	14	1		
	1880	57	14	1		
	1881	55	14	1		
	1882	59	13	1		
	1883	58	11	1		
	1884	49	7			
	1885	44	7	1		
	1886	....	....	....	....	Can. Temp. Act in force.
	1887	....	....	....	....	do
	1888	....	....	....	....	do
	1889	26	2			
	1890	26	2			
Bruce	1874	180	25			
	1875	119	22			
	1876	88	13	3		
	1877	83	12	2		
	1878	83	9	2	....	Dunkin Act in force for 10 months.
	1879	93	12			
	1880	98	14			
	1881	105	15			
	1882	109	18			
	1883	108	16			
	1884	99	15			
	1885	....	....	....	....	Can. Temp. Act in force.
	1886	....	....	....	....	do
	1887	....	....	....	....	do
	1888	97	6			
	1889	102	6			
	1890	98	6			

SCHEDULE B.—Comparative Statement, etc.—*Continued.*

COUNTY.	Year.	Tavern Licenses.	Shop Licenses.	Wholesale Licenses.	Vessel Licenses.	REMARKS.
Carleton (not including Ottawa)	1874	89	5			
	1875	79	8			
	1876	44	1	2		
	1877	55	3			
	1878	43	3			
	1879	43	1			
	1880	42	3			
	1881	50	3			
	1882	54	1			
	1883	58				
	1884	58	1			
	1885	55				
	1886	....	....	....	....	Can. Temp. Act in force.
	1887	....	....	....	....	do
	1888	....	....	....	....	do
	1889	44	1			
	1890	44	1			
Dufferin	1881	33	7	....	....	New County erected 24th January, 1881.
	1882	33	5			
	1883	34	5			
	1884	34	4			
	1885	....	....	....	....	Can. Temp. Act in force.
	1886	....	....	....	....	do
	1887	....	....	....	....	do
	1888	24	2			
	1889	27	2			
	1890	26	2			
Elgin	1874	113	25			
	1875	110	24			
	1876	66	16	2		
	1877	66	10			
	1878	69	12			
	1879	72	16			
	1880	74	12			
	1881	74	13			
	1882	74	13			
	1883	74	16			
	1884	74	12			
	1885	71	10			
	1886	....	....	....	....	Can. Temp. Act in force.
	1887	....	....	....	....	do
	1888	....	....	....	....	do
Not including St. Thomas.	1889	48	2			
	1890	44	1			
Essex	1874	120	28	6		
	1875	101	25	6		
	1876	62	14	5	1	
	1877	69	18	1	1	
	1878	69	18	2	1	
	1879	71	18	3	1	
	1880	70	19	2	1	
	1881	74	21	2		
	1882	71	20	2		
	1883	74	19	2		
	1884	70	15	1		
	1885	77	13			
	1886	74	16			
	1887	84	15			
	1888	82	10			
	1889	95	12			
	1890	94	8			

SCHEDULE B.—Comparative Statement, etc.—*Continued.*

COUNTY.	Year.	Tavern Licenses.	Shop Licenses.	Wholesale Licenses.	Vessel Licenses.	REMARKS.
Frontenac (not including Kingston)	1874	71	2			
	1875	57	29			
	1876	29	....	1		
	1877	17	....	....	....	Dunkin Act assumed to be in force until quashed, December 28th.
	1878	34				
	1879	36				
	1880	33	1			
	1881	33	1			
	1882	33	2			
	1883	36	2			
	1884	34	2			
	1885	34	1			
	1886	....	....	....	....	Can. Temp. Act in force.
	1887	....	....	....	....	do
	1888	....	....	....	....	do
	1889	23	....	....	....	
	1890	25				
Grey	1874	115	20		3	
	1875	114	16		2	
	1876	77	11	5	2	
	1877	....	....	6	2	Dunkin Act in force.
	1878	72	7	4	1	Dunkin Act in force until September.
	1879	91	12	1	1	
	1880	88	17	1	2	
	1881	84	16	....	1	Melancthon and Shelburne attached to new County of Dufferin.
	1882	88	18	....	1	
	1883	95	20	....	3	
	1884	91	19	....	1	
	1885	92	18			
	1886	92	16	....	3	
	1887	86	14	....	3	
	1888	84	7	... .	4	
	1889	84	6	....	1	
	1890	81	6			
Haldimand	1874	96	16			
	1875	83	13			
	1876	45	5			
	1877	49	4			
	1878	49	4			
	1879	50	5			
	1880	47	5			
	1881	51	5			
	1882	52	5			
	1883	51	5			
	1884	47	5			
	1885	47	3			
	1886	48	4			
	1887	40	2	....	....	The licenses issued in the Monck portion of this County are not included in this schedule in 1887 ; they are 9 hotel and 2 shop.
	1888	43	4			
	1889	45	3			
	1890	49	3			
Haliburton	1886	7	. ...	....	... .	See Victoria, *post.*
	1887	6				
	1888	6				
	1889	7				
	1890	7				

SCHEDULE B.—Comparative Statement, etc.—*Continued.*

COUNTY.	Year.	Tavern Licenses.	Shop Licenses.	Wholesale Licenses.	Vessel Licenses.	REMARKS.
Halton....................	1874	61	4			
	1875	58	5			
	1876	39	2	1		
	1877	38	1			
	1878	38	1			
	1879	42	1			
	1880	41	1			
	1881	41	1			
	1882	....	....	....	....	Can. Temp. Act in force.
	1883	....	....	....	....	do
	1884	....	....	....	....	do
	1885	....	....	....	....	do
	1886	....	....	....	....	do
	1887	....	....	....	....	do
	1888	28				
	1889	28				
	1890	27				
Hastings..................	1874	117	23	1		
	1875	100	21	2		
	1876	76	11	3	1	
	1877	82	14	3	1	
	1878	89	15	3	2	
	1879	94	15	3	1	
	1880	91	16	3		
	1881	90	15	3		
	1882	95	13	3		
	1883	97	15	3		
	1884	99	15	3		
	1885	98	17	3		
	1886	104	16	2		
	1887	102	13	2		
	1888	96	13	3		
Not including Belleville...	1889	73	9			
	1890	74	8			
Huron....................	1874	150	38			
	1875	164	37	2		
	1876	113	16	3		
	1877	124	16			
	1878	127	20			
	1879	134	21			
	1880	131	16			
	1881	128	15			
	1882	124	15			
	1883	124	15			
	1884	111	14			
	1885	....	....	....	....	Can. Temp. Act in force.
	1886	....	....	....	....	do
	1887	....	....	....	....	do
	1888	108	11			
	1889	109	8			
	1890	103	6			
Kent......................	1874	128	41	....	1	
	1875	118	34	....	1	
	1876	66	13	4	1	
	1877	67	15	....	1	
	1878	65	13			
	1879	67	14			
	1880	67	13			
	1881	69	13	....	1	
	1882	69	14	....	1	
	1883	70	14			
	1884	75	11			
	1885	71	8			
	1886	....	....	....	....	Can. Temp. Act in force.
	1887	....	....	....	....	do
	1888	....	....	....	....	do
	1889	72	6			
	1890	75	6			

SCHEDULE B.—Comparative Statement, etc.—*Continued.*

COUNTY.	Year.	Tavern Licenses.	Shop Licenses	Wholesale Licenses.	Vessel Licenses	REMARKS.
Lambton	1874	89	44	1		
	1875	85	33			
	1876	65	28	1		
	1877	65	25			
	1878	70	27			
	1879	72	26			
	1880	71	25			
	1881	72	22			
	1882	75	22			
	1883	73	19			
	1884	74	16	1		
	1885	70	10	1		
	1886	....	....	....	....	Can. Temp. Act. in force.
	1887	....	....	....	....	do
	1888	....	....	....	....	do
	1889	65	9			
	1890	70	10			
Lanark	1874	62	20	2		
	1875	62	14	1		
	1876	32	9	2		
	1877	32	9			
	1878	7	4	....	....	Dunkin Act in force, except in Perth.
	1879	33	6			
	1880	34	8			
	1881	36	6			
	1882	36	7			
	1883	35	7			
	1884	36	7			
	1885	37	6			
	1886	....	....	....	....	Can Temp. Act in force.
	1887	....	....	....	....	do
	1888	....	....	....	....	do
	1889	39	6			
	1890	45	7			
Leeds and Grenville	1874	145	32	1		
	1875	136	23	1		
	1876	79	23	3		
	1877	101	25			
	1878	97	19			
	1879	97	18			
	1880	97	20	1		
	1881	89	18			
	1882	92	21			
	1883	94	21			
	1884	88	17			
	1885	87	17			
	1886	....	....	....	....	Can. Temp. Act. in force.
	1887	....	....	....	....	do
	1888	....	....	....	....	do
	1889	73	13			
	1890	70	10			
Lennox and Addington	1874	52	7		1	
	1875	46	8	....		
	1876	28	6	1		
	1877	....	....	1	....	Dunkin Act in force.
	1878	36	6			
	1879	37	5			
	1880	37	5			
	1881	41	5			
	1882	43	6			
	1883	45	6			
	1884	44	5			
	1885	42	5			
	1886	....	....	....	....	Can. Temp. Act in force.
	1887	....	....	....	....	do
	1888	....	....	....	....	do
	1889	52	3			
	1890	49	2			

SCHEDULE B.—Comparative Statement, etc.—*Continued.*

County.	Year.	Tavern Licenses.	Shop Licenses.	Wholesale Licenses	Vessel Licenses.	Remarks.
Lincoln (not including St. Catharines)	1874	94	23			
	1875	103	37			
	1876	70	31			
	1877	70	25			
	1878	69	21			
	1879	72	16			
	1880	73	12			
	1881	69	14			
	1882	73	15			
	1883	72	13			
	1884	71	11			
	1885	64	10			
	1886	....	....	....	....	Can. Temp. Act in force.
	1887	....	....	....	....	do
	1888	....	....	....	....	do
	1889	36	3			
	1890	36	3			
Middlesex (not including London)	1874	188	17	1		
	1875	174	33			
	1876	122	26	3		
	1877	139	23			
	1878	113	21			
	1879	141	19			
	1880	134	18			
	1881	138	18			
	1882	133	16			
	1883	130	18			
	1884	126	17			
	1885	128	16	....	1	
	1886	....	....	....	....	Can. Temp. Act in force.
	1887	....	....	....	....	do
	1888	....	....	....	....	do
	1889	82	8			
	1890	93	6			
Muskoka and Parry Sound.	1874	9				
	1875	23				
	1876	19				
	1877	22				
	1878	29				
	1879	38	1			
	1880	44	4			
	1881	45	4			
	1882	48	5			
	1883	49	6			
	1884	48	4			
	1885	37	1			
	1886	23				
	1887	21				
	1888	32	1			
	1889	45	2			
	1890	47	1			
Nipissing	1878	2	1			
	1879	3	1			
	1880	3	1			
	1881	11	8			
	1882	8	5			
	1883	9	5			
	1884	5	5			
	1885	23	6			
	1886	22	4			
	1887	24	5			
	1888	23	4			
	1889	23	4			
	1890	27	4			

SCHEDULE B.—Comparative Statement, etc.—*Continued.*

COUNTY.	Year.	Tavern Licenses.	Shop Licenses.	Wholesale Licenses.	Vessel Licenses.	REMARKS.
Norfolk	1874	73	6			
	1875	74	6			
	1876	51	4	2		
	1877	51	5	1		
	1878	55	5			
	1879	51	7			
	1880	51	6			
	1881	55	6			
	1882	56	6			
	1883	54	6			
	1884	51	4			
	1885	....	....	....	....	Can. Temp. Act in force.
	1886	....	....	....	....	do
	1887	....	....	....	....	do
	1888	37	4			
	1889	41	3			
	1890	39	2			
Northumberland and Durham	1874	135	35	2	1	
	1875	121	32	2	1	
	1876	102	27	4	1	
	1877	103	25	2	1	
	1878	89	21	2	2	Dunkin Act in force for 10 months, except in Port Hope and Cobourg.
	1879	98	21	....	1	
	1880	100	22	....	1	
	1881	100	23	....	1	
	1882	102	23	....	1	
	1883	104	23	....	1	
	1884	101	19			
	1885	97	16			
	1886	....	....	....	....	Can. Temp. Act in force.
	1887	....	....	....	....	do
	1888	....	....	....	....	do
	1889	81	14			
	1890	74	13			
Ontario	1874	86	35			
	1875	87	23			
	1876	60	10			
	1877	58	9			
	1878	55	8	2	....	Dunkin Act in force for 10 months.
	1879	61	9			
	1880	65	11			
	1881	66	12			
	1882	71	13			
	1883	72	12			
	1884	68	11			
	1885	67	12			
	1886	....	....	....	....	Can. Temp. Act in force.
	1887	....	....	....	....	do
	1888	....	....	....	....	do
	1889	61	7			
	1890	62	7			
Oxford	1874	104	29			
	1875	102	25			
	1876	73	9	4		
	1877	70	10	1		
	1878	71	10			
	1879	74	12			
	1880	74	14			
	1881	73	13			
	1882	74	11			
	1883	72	9			
	1884	62	8			
	1885	....	....	....	....	Can. Temp. Act in force.
	1886	....	....	....	....	do
	1887	....	....	....	....	do
	1888	....	....	....	....	do
	1889	52	6	1		
	1890	58	7	1		

SCHEDULE B.—Comparative Statement, etc.—*Continued.*

COUNTY.	Year.	Tavern Licenses.	Shop Licenses.	Wholesale Licenses.	Vessel Licenses.	REMARKS.
Peel	1874	91	15			
	1875	86	15			
	1876	49	10			
	1877	57	9			
	1878	60	8			
	1879	57	7			
	1880	62	7			
	1881	56	7			
	1882	57	6			
	1883	57	5			The licenses issued in the Village of Boulton and Township of Albion, in Cardwell, are not included in this schedule for 1887. There were 10 tavern.
	1884	55	4			
	1885	58	4			
	1886	55	5			
	1887	46	4			
	1888	57	3			
	1889	52	3			
	1890	52	3			
Perth	1874	145	33			
	1875	135	25			
	1876	101	13	3		
	1877	105	17			
	1878	105	17			
	1879	110	18			
	1880	110	19			
	1881	106	19			
	1882	110	19			
	1883	109	17			
	1884	102	14			
	1885	93	14			
	1886	95	12			
	1887	95	13			
	1888	96	10			
Not including Stratford	1889	74	5			
	1890	72	5			
Peterborough	1874	98	16			
	1875	72	16			
	1876	40	11	2	1	
	1877	43	11	....	1	
	1878	35	11	....	1	Dunkin Act in force in part of West Riding for 10 months.
	1879	42	13	....	1	
	1880	46	12	....	1	
	1881	46	14	....	1	
	1882	50	15	....	1	
	1883	50	14	....	1	
	1884	46	13	....	1	
	1885	43	12			
	1886	....	....	....	....	Can. Temp. Act in force.
	1887	....	....	....	....	dc
	1888	....	....	....	....	do
	1889	43	10	....	1	
	1890	41	11			
Prescott and Russell	1874	63	10			
	1875	58	11	1		
	1876	52				
	1877	46	5			
	1878	49	5			
	1879	41	5			
	1880	42	4			
	1881	50	5			
	1882	53	6			
	1883	62	7			
	1884	65	4			
	1885	65	3			
	1886	68	1			
	1887	78	1			
	1888	76	1			
	1889	76	1			
	1890	78	2			

SCHEDULE B.—Comparative Statement, etc.—*Continued.*

COUNTY.	Year.	Tavern Licenses.	Shop Licenses.	Wholesale Licenses.	Vessel Licenses.	REMARKS.
Prince Edward	1874	22	3	....	3	
	1875	23	3	....	1	
	1876	....	....	1	1	Dunkin Act in force.
	1877	....	....	....	....	do
	1878	....	....	....	....	do
	1879	23	2	....	1	
	1880	24	2	....	3	
	1881	24	3	....	1	
	1882	22	3	....	2	
	1883	23	4	....	2	
	1884	21	1	....	2	
	1885	23	2	....	2	
	1886	24	2			
	1887	21	2	....	2	
	1888	18	2	....	2	
	1889	16	2	....	2	
	1890	18	2	....	....	
Renfrew	1874	103	35	....	1	
	1875	102	30	1	1	
	1876	51	20	....	1	
	1877	42	17			
	1878	31	15			
	1879	36	16			
	1880	42	21			
	1881	47	17			
	1882	48	23			
	1883	63	30			
	1884	44	20			
	1885	....	....	....	....	Can. Temp. Act in force.
	1886	....	....	....	....	do
	1887	....	....	....	....	do
	1888	55	12			
	1889	55	16			
	1890	56	16			
Simcoe	1874	223	42			
	1875	196	35	2	2	
	1876	155	24	2	2	
	1877	137	24	1	2	
	1878	149	21	1	1	
	1879	142	20	1	1	
	1880	155	23	1	1	
	1881	144	23	1	1	Mono and Mulmur attached to new County of Dufferin.
	1882	146	23	1		
	1883	147	26			
	1884	138	24			
	1885	....	....	....	....	Can. Temp. Act in force.
	1886	....	....	....	....	do
	1887	....	....	....	....	do
	1888	121	17			
	1889	124	18			
	1890	123	17			
Stormont, Dundas and Glengarry	1874	122	31			
	1875	80	28			
	1876	82	22			
	1877	87	17			
	1878	91	17			
	1879	91	16			
	1880	91	18			
	1881	96	18			
	1882	95	18			
	1883	89	17			
	1884	92	15			
	1885	....	....	....	....	Can. Temp. Act in force.
	1886	....	....	....	....	do
	1887	....	....	....	....	do
	1888	105	8			
	1889	111	10			
	1890	103	8			

SCHEDULE B.—Comparative Statement, etc.—*Continued.*

COUNTY.	Year.	Tavern Licenses.	Shop Licenses.	Wholesale Licenses.	Vessel Licenses.	REMARKS.
Victoria	1874	78	13	1		
	1875	70	9	....	1	
	1876	55	5	1	....	
	1877	56	5	....	....	
	1878	56	6	....	....	
	1879	60	6	....	....	
	1880	59	5	....	....	Including Haliburton.
	1881	62	4	....	....	
	1882	63	3	....	1	
	1883	62	3	....	2	
	1884	58	3	....	....	
	1885	54	3	....	....	
	1886	....	....	....	....	Can. Temp. Act in force.
	1887	....	....	....	....	do
	1888	....	....	....	....	do
	1889	46	2			
	1890	44	2			
Waterloo	1874	135	21			
	1875	136	20	3		
	1876	86	19	13		
	1877	84	17	10		
	1878	87	17			
	1879	89	15			
	1880	87	15			
	1881	88	16			
	1882	90	17			
	1883	91	15	....	1	
	1884	92	14			
	1885	90	13			
	1886	87	12			
	1887	87	12			
	1888	90	9	1		
	1889	91	10	1		
	1890	92	10	1		
Welland	1874	145	28	3		
	1875	151	23			
	1876	73	19			
	1877	80	19			
	1878	89	21			
	1879	92	25			
	1880	87	29			
	1881	81	19			
	1882	78	20			
	1883	79	18			
	1884	82	14			Licenses issued in Monck Tp. of Wainfleet, are not included in this schedule in 1887. There were 2 tavern.
	1885	78	15			
	1886	82	12			
	1887	76	10			
	1888	70	8			
	1889	73	9			
	1890	73	9			
Wellington	1874	183	52			
	1875	182	41	3		
	1876	138	29	3		
	1877	130	28	3		
	1878	134	29			
	1879	133	29			
	1880	145	30			
	1881	134	24	....	....	Orangeville, Amaranth and East Garafaxa, attached to new County of Dufferin.
	1882	128	26			
	1883	126	22			
	1884	116	19			
	1885	104	13			
	1886	....	....	....	....	Can. Temp. Act in force.
	1887	....	....	....	....	do
	1888	....	....	....	....	do
Not including Guelph	1889	78	5			
do	1890	77	4			

SCHEDULE B.—Comparative Statement, etc.—*Continued.*

COUNTY.	Year.	Tavern Licenses.	Shop Licenses.	Wholesale Licenses.	Vessel Licenses.	REMARKS.
Wentworth (not including Hamilton)	1874	110	32	4		
	1875	107	19	2		
	1876	61	11	2		
	1877	56	10			
	1878	47	6			
	1879	63	6			
	1880	56	6			
	1881	55	6			
	1882	51	6			
	1883	52	6			
	1884	54	6			
	1885	54	6			
	1886	49	6			
	1887	51	5			
	1888	47	4			
	1889	49	3			
	1890	49	4			
York (not including Toronto)..................	1874	148	39			
	1875	164	35			
	1876	108	16	1		
	1877	97	15			
	1878	....	....	....	....	Dunkin Act in force.
	1879	114	15	....	....	do one month (May.)
	1880	117	16			
	1881	128	21			
	1882	131	24			
	1883	132	23			
	1884	121	13			
	1885	114	12			
	1886	116	10			
	1887	109	7			
	1888	107	2			
	1889	112	1			
	1890	108	2			

SCHEDULE B.—Comparative Statement, etc.—*Continued.*

CITY.	Year.	Tavern Licenses.	Shop Licenses.	Wholesale Licenses.	Vessel Licenses.	REMARKS.
Toronto	1874	309	184	21	16	
	1875	299	128	28	9	
	1876	216	100	39	9	
	1877	182	100	26	6	
	1878	181	92	20	10	
	1879	195	98	19	6	
	1880	204	94	18	4	
	1881	210	95	15	6	
	1882	216	100	14	7	
	1883	197	98	14	5	
	1884	217	88	13	3	
	1885	227	71	14*	2*	
	1886	224	66	13	3	
	1887	150	50	13	1	
	1888	150	50	12	3	
	1889	152	50	14	3	
	1890	150	50	11		
Hamilton	1874	127	93	... .	3	
	1875	110	72	....		
	1876	68	61	11	1	
	1877	68	55	7	2	
	1878	68	64	7	2	
	1879	68	61	8		
	1880	74	57	7		
	1881	89	55	7		
	1882	98	58	8		
	1883	105	54	8		
	1884	97	47	4		
	1885	110	48	3		
	1886	112	45	5		
	1887	107	40	4		
	1888	111	37	2		
	1889	91	38	3		
	1890	92	38	3		
Ottawa..................	1874	120	77	6		
	1875	114	148	7		
	1876	75	77	7	1	
	1877	75	80	2	1	
	1878	73	77	....	1	
	1879	73	71	....	1	
	1880	75	72	....	1	
	1881	75	77	....	1	
	1882	75	76	....	1	
	1883	75	84	.. ..	1	
	1884	75	78	....	1	
	1885	75	77	....		
	1886	75	69	1		
	1887	75	68	1	1 B. & W.	
	1888	76	54	2	1	
	1889	80	56	1	1 B. & W.	
	1890	88	59	2		

*Dominion issues.

SCHEDULE B.—Comparative Statement, etc.—*Continued.*

CITY.	Year.	Tavern Licenses.	Shop Licenses.	Wholesale Licenses.	Vessel Licenses.	REMARKS.
London	1874	75	40	3		
	1875	75	74	2		
	1876	57	34	5		
	1877	58	35	1		
	1878	58	37	1		
	1879	57	36	2		
	1880	45	27	2		
	1881	45	24	2		
	1882	47	26	3		
	1883	47	24	2		
	1884	48	22	2		
	1885	49	22	1		
	1886	61	21	2		
	1887	54	19	2		
	1888	57	14	1		
	1889	58	13	1		
	1890	56	12	1		
Kingston	1874	97	25	....	1	
	1875	75	20	3	1	
	1876	53	23	6	5	
	1877	61	21	3	8	
	1878	61	21	3	8	
	1879	62	20	3	8	
	1880	62	20	3	8	
	1881	64	20	2	11	
	1882	53	22	2	9	
	1883	53	23	3	6	
	1884	39	20	2	6	
	1885	38	22	1	4	
	1886	41	22	1	6	
	1887	43	20	1	6	
	1888	44	15	1	7	
	1889	40	15	1	7	
	1890	38	15	1		
St. Catharines	1886	29	7			
	1887	23	7			
	1888	26	7			
	1889	26	6			
	1890	26	5			
Brantford	1886	19	5	3		
	1887	18	5	3		
	1888	18	5	3		
	1889	18	5	3		
	1890	18	5	2		
St. Thomas	1889	20	6			
	1890	18	4			
Stratford	1889	21	4			
	1890	21	4			
Guelph	1889	16	2			
	1890	16	2			
Belleville	1889	25	3	2		
	1890	25	3	2		

SCHEDULE B.—*Concluded.*

RECAPITULATION, showing the total number of Provincial licenses issued in the several Counties in the Province, including the cities, during the license years 1874-5-6-7-8-9-80-1-2-3-4-5-6-7-8-9-90.

Years.	Tavern.	Shop.	Wholesale.	Vessel.	Total.
1874	4793	1307	52	33	6185
1875	4459	1257	78	24	5818
1876	2977	787	147	27	3938
1877	2845	739	65	27	3676
1878	2910	724	52	29	3715
1879	3199	757	42	22	4020
1880	3227	760	40	22	4049
1881	3311	764	34	24	4133
1882	3317	787	35	24	4163
1883	3363	781	36	21	4201
1884	3253	675	28	14	3970
1885	2574	525	24	9	3132
1886	1567	367	28	12	1974
1887	1496	325	28	13	1862
1888	2066	336	26	17	2445
1889	3073	445	27	15	3560
1890	3071	428	24	....	3523

The Six Months' Licenses and the Licenses *extended* do not appear in the above Schedule or recapitulation, and as a consequence the total number of Licenses issued, according to the Statement, does not correspond with the number as shown in Schedules A. and C. Beer and Wine Licenses are included with the ordinary licenses under the heads of Tavern Licenses and Vessel Licenses respectively. An *extended* License is good for a period not exceeding three months. It is not in the nature of a new license, but simply a permission, granted by the Board of Commissioners, to the holder of license expiring in April, to continue his business under the old license for the specified period, that he may be enabled to dispose of his stock on hand and quit the business without loss. Six Months' Licenses run from the first day of May to the thirty-first day of October, and are not valid after the latter date. They are granted in localities which are largely resorted to in summer by visitors, where the Board of Commissioners are of opinion that increased tavern accommodation for the summer months is necessary.

SCHEDULE C

Comparative Statement by Municipalities, showing the number of Provincial Licenses, whether Ordinary or Beer and Wine, issued, and the number extended, transferred or removed, the gross sums deposited to the credit of the License Fund Accounts therefor, and for Fines, and the revenue paid over to the Municipal Treasurers during the license years 1888-9, 1889-90 and 1890-91, respectively.

License District.	Municipality.	Tavern. Ordinary.			Tavern. Beer and Wine.			Shop.			Wholesale.			Extended Tavern.			Extended Shop.			Six Months.		
		1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.
Addington	Newburg	...	2	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Camden	...	12	11	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Sheffield	...	8	8	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Kaladar and Anglesea	...	3	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Barrie	...	1	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Kennebec	...	1	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Olden	...	1	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Oso	...	2	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Hinchinbrooke	...	4	4	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Palmerston and N. & S. Canonto	...	2	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Clarendon and Miller	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Denbigh	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Algoma	Sault Ste. Marie	6	7	7	...	...	...	2	3	3	...	...	...	...	...	...	...	...	...	...	2	...
	St. Joseph	1	3	4	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...
	Hilton	1	2	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Unorganized Territory	11	13	15	...	...	...	3	2	2	...	...	...	...	...	...	...	...	...	...	...	...
	Thessalon	3	3	4	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...

SCHEDULE C.—*Continued.*

License District.	Municipality.	Licenses Transferred and Removed.						Total.			Amounts received for Provincial Licenses, Transfers, Removals and Fines in each Municipality.			Proportion thereof paid to Municipalities.			Remarks.
		Transfers.			Removals.												
		1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	
											$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	
Addington	Newburg		1						3	2		245 00	300 00		51 00	81 64	Can. Temp. Act in force in 1888-9.
	Camden			4					12	15		1100 00	1085 00		301 88	355 08	
	Sheffield		2	1					10	9		730 00	725 00		199 90	228 09	
	Kaladar and Anglessa								3	2		270 00	195 00		73 44	63 48	
	Barrie								1	1		90 00	90 00		21 48	28 22	
	Kennebec		1						2	1		95 00	90 00		26 50	28 22	
	Olden		1						2	1		95 00	90 00		26 52	28 20	
	Oso								2	1		310 00	155 00		178 96	93 20	
	Hinchinbrooke		1						5	4		365 00	360 00		99 94	112 88	
	Palmerston and N. & S. Canonto			1			1		2	4		220 00	190 00		88 94	61 13	
	Clarendon and Miller								1			90 00			24 48		
	Denbigh												50 00			23 52	
Algoma	Sault Ste. Marie	2	2	1				12	12	11	1850 00	2030 00	2055 00	809 06	927 20	945 05	
	St Joseph		1	1				2	4	5	305 00	295 00	365 00	121 21	105 50	127 52	
	Hilton							1	2	1	90 00	180 00	90 00	26 44	61 76	31 22	
	Unorganized Territory	1		2				15	15	19	1378 20	1458 25	1630 00				Payable to Province, less proportion of expenses.
	Thessalon	1	2					4	5	4	305 00	310 00	620 00	117 79	127 78	375 34	

SCHEDULE C.—Comparative Statement by Municipalities, shewing the number of Provincial licenses, etc.—*Continued.*

License District.	MUNICIPALITY.	Tavern.						Shop.			Wholesale.			Extended Tavern.			Extended Shop.			Six Months.		
		Ordinary.			Beer and Wine.																	
		1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.
North Brant	South Dumfries	....	4	4	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Brantford, Township	....	2	3	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Onandaga	....	3	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Paris	....	8	8	....	....	....	....	2	2	....	....	....	....	....	....	....	....	....	....	....	....
South Brant	Brantford, Township	....	3	4	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Burford	....	4	3	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Oakland	....	2	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Brantford City	....	18	18	18	....	....	....	5	5	5	3	3	2	....	....	....	....	....	....	....	....	....
Brockville and Leeds.	Brockville	....	11	11	....	....	....	....	2	2	....	....	....	....	....	....	....	....	....	....	....	....
	Gananoque	....	6	6	....	....	....	....	2	2	....	....	....	....	....	....	....	....	....	....	....	....
	Newboro'	....	2	2	....	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....	1	....
	Bastard and Burgess	....	3	4	....	....	....	....	3	1	....	....	....	....	....	....	....	....	....	....	1	1
	North Crosby	....	3	3	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Front of Leeds and Lansdowne	....	2	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Front of Yonge and Escott	....	2	1	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Rear of Yonge and Escott	....	3	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1	1
	Rear of Leeds and Lansdowne	....	4	4	....	....	....	....	2	2	....	....	....	....	....	....	....	....	....	....	....	....
	Elizabethtown	....	2	1	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1B&W.	1B&W.
	South Crosby	....	2	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1
	Athens	....	....	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....

SCHEDULE C.—*Continued.*

License District.	MUNICIPALITY.	Licenses Transferred and Removed.						Total.			Amount received for Provincial Licenses, Transfers, Removals, and Fines in each Municipality.			Proportion thereof paid to Municipalities.			REMARKS.
		Transfers.			Removals.												
		1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889 90.	1890-1.	
											$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	
North Brant....	South Dumfries	....	....	1	....	....	....	....	4	5	....	400 00	425 00	....	120 00	132 51	Can. Temp. Act in force in 1888-9.
	Brantford, Township	....	1	....	....	....	....	....	3	3	....	225 00	270 00	....	60 00	62 83	
	Onandaga	....	....	....	....	....	....	....	3	2	....	280 00	180 00	....	60 00	41 88	
	Paris	....	1	1	....	....	....	....	11	11	....	2045 00	2125 00	....	766 67	822 86	
South Brant...	Brantford, Township	....	....	....	....	....	....	....	3	4	....	320 00	360 00	....	30 00	11 16	Can. Temp. Act in force in 1888-9.
	Burford	....	1	1	....	....	....	....	5	4	....	385 60	275 00	....	....	14 46	
	Oakland	....	2	2	..	....	....	....	4	4	....	190 00	190 00	....	....	7 84	
Brantford City	....	5	6	6	....	....	1	31	32	32	7335 00	7380 00	7135 00	3383 59	3380 86	3229 35	
Brockville and Leeds.	Brockville	....	1	1	....	....	....	....	14	14	....	7215 00	7255 00	....	5818 38	3968 07	Can. Temp. Act in force in 1888-9.
	Gananoque	....	....	....	....	....	....	....	8	8	....	2080 00	2160 00	....	1376 48	1289 18	
	Newboro'	....	....	....	....	....	....	....	4	2	....	560 00	390 00	....	252 20	177 72	
	Bastard and Burgess	....	....	....	....	....	....	...	7	6	....	820 00	640 00	....	396 82	314 74	
	North Crosby	....	....	....	....	....	....	....	3	3	....	390 00	300 00	....	216 18	122 58	
	Front of Leeds and Lansdowne	....	....	....	....	....	....	....	2	2	....	180 00	180 00	....	64 12	61 72	
	Front of Yonge and Escott	..	....	....	....	....	....	....	2	2	....	180 00	137 50	....	64 12	51 44	
	Rear of Yonge and Escott	..	....	....	....	....	....	....	4	2	....	350 00	150 00	....	147 20	61 30	
	Rear of Leeds and Lansdowne	....	....	....	....	....	....	....	6	6	....	540 00	510 00	....	192 36	185 16	
	Elizabetht-wn	...	....	1	....	....	....	....	4	3	....	406 25	173 75	....	258 16	76 86	
	South Crosby	....	....	....	...	....	....	....	2	2	....	307 55	285 00	....	132 29	123 44	
	Athens	....	....	....	....	....	....	....	....	2	....	....	290 00	....	....	87 44	

CHEDULE C.—Comparative Statement by Municipalities, shewing the number of Provincial Licenses, etc.—*Continued.*

License District.	Municipality.	Tavern.						Shop.			Wholesale.			Extended Tavern.			Extended Shop.			Six Months.		
		Ordinary.			Beer and Wine.																	
		1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.
Centre Bruce	Paisley	5	5	5	....	....	....	1	1	1	....	....	....	....	....	....	....	....	....	....	....	....
	Kincardine, Town	6	7	6	....	....	....	1	1	1	....	....	....	....	....	....	....	....	....	....	....	....
	Chesley	2	3	3	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1	....	....
	Greenock	7	7	7	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Huron	4	4	4	....	....	....	....	1	1	....	....	....	....	....	....	....	....	....	....	....	....
	Kincardine, Township	2	2	1	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Elderslie	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
North Bruce	Tiverton	2	2	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Port Elgin	6	6	6	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Southampton	3	3	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Tara	3	3	3	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Wiarton	5	5	5	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Bruce	2	2	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Saugeen	1	1	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Arran	4	4	4	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Amabel	2	2	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Eastnor	4	3	3	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Albemarle	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Lindsay & St. Edmunds	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
South Bruce	Lucknow	5	5	4	1	....	....	1	1	1	....	....	....	....	....	....	....	....	....	....	....	....
	Teeswater	4	4	4	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Walkerton	8	8	8	....	....	....	2	2	2	....	....	....	....	....	....	....	....	....	....	....	....
	Culross	2	2	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Carrick	10	11	11	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Brant	6	9	9	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Kinloss	3	4	4	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....

SCHEDULE C.—*Continued.*

License District.	MUNICIPALITY.	Licenses Transferred and Removed. Transfers. 1888-9.	Transfers. 1889-90.	Transfers. 1890-1.	Removals. 1888-9.	Removals. 1889-90.	Removals. 1890-1.	Total. 1888-9.	Total. 1889-90.	Total. 1890-1.	Amounts received for Provincial Licenses, Transfers, Removals, and Fines in each Municipality. 1888-9.	1889-90.	1890-1.	Proportion thereof paid to Municipalities. 1888-9.	1889-90.	1890-1.	REMARKS.
											$ c	$ c.	$ c	$ c.	$ c.	$ c.	
Centre Bruce	Paisley	....	....	....	....	....	....	6	6	6	1260 00	1300 00	1200 00	687 86	699 28	651 32	
	Kincardine, Town	..	4	....	....	....	....	7	12	7	1720 00	1712 00	1450 00	785 54	758 48	640 34	
	Chesley	1	....	2	....	....	....	4	3	5	442 50	525 00	535 00	229 22	250 82	255 44	
	Greenock	1	1	2	....	..	...	8	8	9	635 00	635 00	680 00	210 37	202 59	223 70	
	Huron	....	1	....	..	...	...	5	6	5	1040 00	780 00	650 00	693 02	457 30	316 60	
	Kincardine, Township	2	....	....	....	....	1	4	2	2	270 00	300 00	130 00	103 93	177 20	65 94	
	Elderslie	....	....	....	....	..	....	....	....	....	100 00	....	....	49 50	....	....	
North Bruce	Tiverton	1	....	1	....	....	....	3	2	3	515 00	300 00	325 00	281 70	108 00	121 16	
	Port Elgin	2	6	5	....	....	....	7	12	11	1450 00	1490 00	1495 00	895 04	868 00	894 98	
	Southampton	....	....	....	....	....	.	3	3	2	660 00	600 00	410 00	385 14	312 00	214 82	
	Tara	....	1	....	....	....	.. .	3	4	3	600 00	605 00	600 00	325 15	312 00	315 92	
	Wiarton	....	....	2	....	....	....	5	5	7	1100 00	1020 00	1030 00	641 94	528 00	539 14	
	Bruce	....	2	....	....	....	....	2	4	2	310 60	260 00	250 00	186 76	120 00	120 60	
	Saugeen	....	....	....	....	....	....	1	1	1	90 00	90 00	90 00	28 38	24 00	25 30	
	Arran	1	2	2	....	....	...	5	6	6	525 60	495 00	450 00	275 90	178 00	185 44	
	Amabel	1	...	1	....	....	....	3	2	3	265 00	200 00	205 00	139 14	68 00	72 72	
	Eastnor	2	1	2	....	....	....	6	4	5	610 00	515 00	430 00	316 10	312 00	230 12	
	Albemarle	....	....	....	....	....	....	....	....	....	20 00	....	....	8 00	....	....	
	Lindsay & St. Edmunds	....	....	....	....	....	....	....	....	....	50 00	....	....	20 00	....	....	
South Bruce	Lucknow	3	1	....	....	....	....	10	7	5	1040 00	995 00	770 00	444 18	418 90	306 14	
	Teeswater	3	3	....	....	....	....	7	7	4	595 00	835 00	910 00	194 16	464 37	490 77	
	Walkerton	4	4	....	....	..	1	14	14	11	1500 00	2680 00	2443 00	558 43	1590 54	1316 41	
	Culross	....	1	3	....	....	...	2	3	5	220 00	185 00	225 00	72 75	65 63	80 50	
	Carrick	1	3	2	...	....	....	11	14	13	1205 00	1033 00	1060 00	411 61	369 12	356 16	
	Brant	1	4	1	....	....	....	7	13	10	605 00	830 00	815 00	193 29	294 02	265 90	
	Kinloss	....	3	...	1	....	....	4	7	4	325 00	375 00	360 00	106 88	133 88	117 10	

SCHEDULE C.—Comparative Statement by Municipalities, shewing the number of Provincial Licenses, etc.—*Continued.*

License District.	MUNICIPALITY.	Tavern.						Shop.			Wholesale.			Extended Tavern.			Extended Shop.			Six Months.		
		Ordinary.			Beer and Wine.																	
		1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.
Cardwell	Adjala	7	8	7	....	....	....	1	1	1	....	....	....	....	....	1	....	....	....	....	....	....
	Bradford	3	3	3	....	....	....	1	1	1	....	....	....	....	....	....	....	....	....	....	....	....
	Tecumseth	3	3	3	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Bolton	3	3	3	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Albion	7	6	5	....	....	....	....	....	....	....	....	....	....	....	1	....	....	....	....	....	....
	Innisfil	7	9	9	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1	1	1
	West Gwillimbury	3	2	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Beeton	3	3	3	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1	....	....
	Tottenham	3	3	3	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1	....	....
Carleton	Richmond	....	1	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	March	....	1	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Huntley	....	3	3	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	North Gower	....	5	5	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Goulburn	....	2	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Marlborough	....	1	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Fitzroy	....	2	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Nepean	....	11	9	....	....	....	....	1	1	....	....	....	....	....	....	....	....	....	....	....	....
	East Ottawa	....	....	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Cornwall	Cornwall, Town	12	13	13	....	....	....	2	3	2	....	....	....	....	....	....	....	....	....	....	....	....
	Cornwall, Township	11	13	13	1	1	1	1	1	1	....	....	....	....	....	....	....	....	....	....	....	....
Dufferin	Orangeville	8	9	9	....	....	....	2	2	2	....	....	....	....	....	....	....	....	....	....	....	....
	Mulmur	3	4	4	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Mono	3	3	3	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Melancthon	2	2	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Garafraxa, East	1	2	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Shelburne	4	4	4	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Amaranth	1	1	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	East Luther	2	2	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....

SCHEDULE C.—*Continued.*

License District.	MUNICIPALITY.	Licenses Transferred and Removed.						Total.			Amounts received for Provincial Licenses, Transfers, Removals, and Fines in each Municipality.			Proportion thereof paid to Municipalities.			REMARKS.
		Transfers.			Removals.												
		1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	
Cardwell	Adjala	3	3	....	....	....	....	11	12	9	795 00	899 00	857 50	283 04	313 60	298 04	
	Bradford	....	1	....	....	....	....	4	5	4	500 00	635 00	594 00	132 59	252 09	229 22	
	Tecumseth	....	....	1	....	....	....	3	3	4	270 00	470 00	435 00	91 78	279 72	214 59	
	Bolton	....	....	1	....	....		3	3	4	530 00	510 00	515 00	252 00	239 74	240 40	
	Albion	....	....	2	....	....	....	7	6	8	630 00	572 00	484 50	214 19	195 44	159 78	
	Innisfil	....	3	1	1	....	....	9	13	11	880 00	909 75	870 00	334 02	311 49	285 80	
	West Gwillimbury	....	....	....	....	....	....	3	2	2	270 00	180 00	242 00	91 80	59 82	88 92	
	Beeton	....	2	1	....	....	....	4	5	4	510 00	460 00	460 00	152 96	184 74	182 81	
	Tottenham	....	....	....	....	....	1	4	3	4	511 00	530 00	505 00	153 48	234 66	220 16	
Carleton	Richmond	....	....	....	....	....	....	....	1	1	....	120 00	120 00	....	25 80	26 20	Can. Temp. Act in force in 1888-9.
	March	....	....	....	....	....	....	....	1	1	....	90 00	90 00	....	25 80	26 16	
	Huntley	....	....	1	....	....	....	....	3	4	....	270 00	275 00	....	77 38	80 64	
	North Gower	....	....	....	....	....	....	....	5	5	....	450 00	490 00	....	128 94	148 20	
	Goulburn	....	....	....	....	....	....	....	2	2	....	200 00	180 00	....	60 18	52 32	
	Marlborough	....	..	1	....	....	....	....	1	2	....	90 00	95 00	....	25 79	28 32	
	Fitzroy	....	....	1	....	....	....	....	2	3	....	180 00	185 00	....	51 58	54 48	
	Nepean	....	....	4	....	1	....	....	13	14	....	1105 00	920 00	....	320 22	270 18	
	East Ottawa	....	....	....	....	....	....	....	....	2	....	....	240 00	....	....	52 38	
Cornwall	Cornwall, Town	1	3	1	1	....	....	16	19	16	3880 00	4355 00	4155 00	2314 90	2586 47	2456 12	
	Cornwall, Township	....	2	1	1	....	....	14	17	16	1477 50	1487 50	1462 50	639 96	606 27	589 98	
Dufferin	Orangeville	2	6	6	....	....	....	12	17	17	2155 00	2335 00	2300 00	923 90	930 21	939 96	
	Mulmur	....	....	....	....	....	....	3	4	4	340 00	430 00	380 00	110 96	117 95	101 88	
	Mono	....	....	....	....	....	....	3	3	3	270 00	270 00	270 00	79 92	72 00	64 27	
	Malancthon	....	2	....	....	....	....	2	4	2	340 00	190 00	180 00	124 32	49 46	47 00	
	Garafraxa, East	1	1	....	....	....	....	2	3	1	95 00	185 00	95 10	28 86	48 00	24 86	
	Shelburne	2	1	1	....	....	....	6	5	5	800 00	745 00	685 00	382 03	316 04	296 01	
	Amaranth	....	1	....	....	....	....	1	2	1	140 00	95 00	90 00	48 80	24 74	23 52	
	East Luther	....	1	1	....	....	....	2	3	3	180 00	345 00	305 00	53 28	182 78	168 98	

Schedule C.—Comparative Statement by Municipalities, shewing the number of Provincial Licenses, etc.—*Continued.*

License District.	Municipality.	Tavern.						Shop.			Wholesale.			Extended Tavern.			Extended Shop.			Six Months.		
		Ordinary.			Beer and Wine.																	
		1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.
Dundas	Iroquois	3	4	4	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Chesterville	....	....	3	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Morrisburgh	5	5	4	....	....	....	....	1	1	....	....	....	....	....	....	....	....	....	....	....	....
	Winchester, Township.	6	6	..	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Williamsburgh	3	3	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Winchester, Village	2	2	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Mountain	6	6	5	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
E. Durham.	Port Hope	....	11	11	....	....	....	....	1	1	....	....	....	....	....	....	....	....	....	....	....	....
	Millbrook	....	4	4	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Hope	....	2	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Cavan	....	2	3	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Manvers	....	1	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
W. Durham	Bowmanville	....	2	2	....	....	....	....	2	2	....	....	....	....	....	....	....	....	....	....	....	....
	Newcastle	....	2	2	....	1	1	....	1	1	....	....	....	....	....	....	....	....	....	....	....	....
	Clarke	....	4	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Darlington	....	2	1	....	....	....	....	....	....	....	....	....	....	....	1	....	....	....	....	....	....
	Cartwright	....	2	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1

SCHEDULE C.—*Continued.*

License District.	MUNICIPALITY.	Licenses Transferred and Removed.						Total.			Amounts received for Provincial Licenses, Transfers Removals, and Fines in each Municipality.			Proportion thereof paid to Municipalities.			REMARKS.
		Transfers.			Removals.												
		1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	
											$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	
Dundas	Iroquois	....	....	1	....	....	....	3	4	5	555 00	865 00	851 00	268 16	422 72	415 09	
	Chesterville	....	....	....	....	....	....	....	....	4	75 00	10 00	775 00	30 48	3 36	315 58	
	Morrisburgh	....	....	....	....	....	....	5	6	5	1360 00	1620 00	1370 00	846 30	981 44	820 88	
	Winchester, Township	1	2	....	....	....	....	7	8	...	825 00	1091 00	....	387 05	664 94	....	
	Williamsburgh	1	1	....	....	....	....	4	4	1	380 00	325 00	105 00	144 56	108 98	34 60	
	Winchester, Village	....	....	....	....	....	....	2	2	2	490 00	560 00	570 00	304 44	333 92	335 54	
	Mountain	....	1	....	....	....	....	6	7	5	670 00	655 00	890 00	234 75	199 76	443 74	
E. Durham	Port Hope	....	1	1	....	....	....	....	13	13	....	4318 00	4315 00	....	2355 72	2338 72	Can. Temp. Act in force in 1888-9.
	Millbrook	....	1	....	....	....	....	....	5	4	....	885 00	1004 00	....	500 16	542 85	
	Hope	....	....	....	....	....	....	....	2	1	....	354 00	190 00	....	208 86	123 54	
	Cavan	....	....	....	....	....	....	....	4	3	....	500 00	395 00	....	238 09	183 50	
	Manvers	....	....	....	....	....	....	....	2	2	....	350 00	350 00	....	219 06	217 10	
W. Durham	Bowmanville	....	2	2	....	....	....	....	6	6	....	1160 00	1190 00	....	590 96	639 35	Can. Temp. Act in force in 1888-9.
	Newcastle	..	1	....	....	1	....	....	6	4	....	730 00	665 00	....	376 02	312 64	
	Clarke	....	3	....	....	....	....	....	7	4	....	735 00	740 00	....	430 74	456 34	
	Darlington	....	....	....	....	....	....	....	2	2	....	480 00	407 50	....	246 58	184 32	
	Cartwright	....	2	....	....	....	....	....	4	3	....	310 00	312 50	....	156 06	143 08	

SCHEDULE C.—Comparative Statement by Municipalities, shewing the number of Provincial Licenses, etc.—*Continued.*

License District.	MUNICIPALITY.	Tavern.						Shop.			Wholesale.			Extended Tavern.			ExtendenShop.			Six Months.		
		Ordinary.			Beer and Wine.																	
		1888-9.	1889-90.	1890-91.	1888-9.	1889-90.	1890-91.	1888-9.	1889-90.	1890-91.	1888-9.	1889-90.	1890-91.	1888-9.	1889-90.	1890-91.	1888-9.	1889-90.	1890-91.	1888-9.	1889-90.	1890-91.
East Elgin..	Aylmer		5	4					1	1												
	Port Stanley		1	2		1															1	1
	Springfield		2	1												1						
	Vienna		1	1																		
	Yarmouth		6	6		1	1															
	Malahide		3	3		1																1
	Bayham		7	8																		
West Elgin.	St. Thomas		20	18					6	4						2			2			
	Southwold		8	7																		
	Dunwich		5	5					1													
	Aldborough		6	6																		
North Essex	Maidstone	2	3	2																		
	Windsor	17	19	22				4	6	4				3						1	1	1
	Rochester	6	7	6																		
	East Sandwich	10	12	11			1	2	2	2					1	1						
	West Sandwich	7	6	9		1																1
	Sandwich, Town	4	4	5				1	1	1												
	Belle River	2	2	3				1	1	1										1	1	
	Anderdon	2	2	3																		

SCHEDULE C.—*Continued.*

License District.	MUNICIPALITY.	Licenses Transferred and Removed.						Total.			Amount received for Provincial Licences, Transfers, Removals, and Fines in each Municipality.			Proportion thereof paid to Municipalities.			REMARKS.
		Transfers.			Removals.												
		1888-9.	1889-90.	1890-91.	1888-9.	1889-90.	1890-91.	1888-9.	1889-90.	1890-91.	1888-9.	1889-90.	1890-91.	1888-9.	1889-90.	1890-91.	
											$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	
East Elgin..	Aylmer	....	1	2	....	....	....	....	7	7	....	1126 00	1060 00	....	401 39	447 74	Can. Temp. Act in force in 1888-9.
	Port Stanley	....	....	1	....	....	....	...	3	4	....	325 00	559 00	....	154 66	278 44	
	Springfield	....	....	....	....	1	....	....	3	2	....	245 00	150 00	....	62 18	36 54	
	Vienna	....	....	1	....	....	....	....	1	2	....	120 00	125 00	....	29 84	27 94	
	Yarmouth	....	1	1	....	....	....	....	9	8	....	772 00	602 50	....	286 96	178 41	
	Malahide	....	....	1	....	....	....	....	4	5	....	327 50	320 00	....	114 41	92 42	
	Bayham	....	2	1	....	....	....	....	9	9	....	660 00	749 00	....	223 80	218 81	
West Elgin.	St. Thomas	...	4	7	....	2	1	....	32	34	....	8310 00	6990 00	....	4282 38	3514 43	Can. Temp. Act in force in 1888-9.
	Southwold	....	1	....	....	....	....	....	9	7	....	725 00	630 00	....	271 09	213 42	
	Dunwich	....	....	....	....	1	....	....	7	5	....	635 00	510 00	....	294 00	182 94	
	Aldborough	....	1	....	....	....	....	....	7	6	....	805 00	890 00	....	455 19	478 82	
North Essex	Maidstone	....	....	....	....	..	....	2	3	2	180 00	270 00	180 00	64 97	93 00	60 36	
	Windsor	5	5	6	....	....	....	30	31	33	5230 00	6105 00	6300 00	2594 21	2970 23	3078 43	
	Rochester	....	3	1	....	....	....	6	10	7	540 00	645 00	545 00	194 90	224 74	183 62	
	East Sandwich	1	4	....	....	....	....	13	18	15	1125 00	1422 50	1230 00	414 16	514 07	415 02	
	West Sandwich	....	1	....	...	....	....	7	8	10	630 00	582 50	875 00	227 38	208 00	290 92	
	Sandwich, Town	1	....	2	....	...	....	6	5	8	855 00	850 00	1025 00	319 26	313 33	351 48	
	Belle River	....	....	....	....	....	....	4	4	4	420 00	420 00	480 00	113 71	112 00	115 49	
	Anderdon	....	1	2	....	....	....	2	3	5	180 00	185 00	280 00	64 99	64 58	95 58	

Schedule C.—Comparative Statement by Municipalities, shewing the number of Provincial Licenses, etc.—*Continued.*

License District.	Municipality.	Tavern.						Shop.			Wholesale.			Extended Tavern.			Extended Shop.			Six months.		
		Ordinary.			Beer and Wine.																	
		1888-9.	1889-90.	1890-91.	1888-9.	1889-90.	1890-91.	1888-9.	1889-90.	1890-91.	1888-9.	1889-90.	1890-91.	1888-9.	1889-90.	1890-91.	1888-9.	1889-90.	1890-91.	1888-9.	1889-90.	1890-91.
South Essex	Mersea	2	2	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Leamington	4	5	4	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...
	Amherstburg	6	6	6	1	1	1	2	2	2	...	...	...	...	...	...	...	...	...	...	...	...
	Malden	2	2	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Gosfield, South	1	1	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Kingsville	2	3	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Essex Centre	1	4	3	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2
	Colchester, North	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Colchester, South	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Pelee Island	1	1	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Tilbury, West	7	9	9	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Tilbury, Centre	4	4	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Gosfield, North	1	1	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Frontenac	Portsmouth	...	3	3	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Kingston	...	3	4	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Portland	...	5	5	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Pittsburgh	...	3	3	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Storrington	...	2	1	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Wolfe Island	...	3	3	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1 B&W.	1 B&W.
	Loughboro'	...	2	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Bedford	...	1	2	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...

SCHEDULE C.—*Continued.*

License District.	MUNICIPALITY.	Licenses Transferred and Removed.						Total.			Amount received for Provincial Licenses, Transfers, Removals, and Fines in each Municipality.			Proportion thereof paid to Municipalities.			REMARKS.
		Transfers.			Removals.												
		1888-9.	1889-90.	1890-91.	1888-9.	1889-90.	1890-91.	1888-9.	1889-90.	1890-91.	1888-9.	1889-90.	1890-91.	1888-9.	1889-90.	1890-91.	
											$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	
South Essex	Mersea	1	....	....	....	....	....	3	2	2	225 00	220 00	220 00	97 66	98 15	98 62	Dunkin Act in force.
	Leamington	2	1	....	....	....	....	7	6	4	550 00	1005 00	880 00	129 16	547 78	436 32	
	Amherstburg	2	1	....	....	....	....	11	10	9	1547 50	1456 50	1477 50	544 44	518 71	531 73	
	Malden	....	1	1	....	....	....	2	3	3	220 00	185 00	185 00	72 80	60 56	61 06	
	Gosfield, South	....	....	....		....	....	1	1	1	160 00	160 00	160 00	97 68	99 08	99 31	
	Kingsville	....	....	....	....	....	....	3	3	4	350 00	420 00	420 00	119 18	147 22	147 94	
	Essex Centre	....	....	....	....	....	....	1	4	3	280 00	1040 00	660 00	144 58	676 30	327 34	
	Colchester, North	....	....	....	....	....	....	....	....	....	20 00	......	....	9 22	......	......	
	Colchester, South	....	....	....	....	....	....	....	....	....	80 00	......	155 00	36 92	....	75 73	
	Pelee Island	....	....	....	....	..	....	1	1	1	90 00	90 00	90 00	27 68	29 08	29 30	
	Tilbury, West	1	....	2	....	....	....	8	9	11	730 00	810 00	820 00	239 88	261 66	268 70	
	Tilbury, Centre	2	1	....	....	....	....	6	5	....	370 00	365 00	......	115 37	118 72	......	
	Gosfield, North	....	....	....	....	....	1	1	1	2	190 00	160 00	165 00	127 68	99 06	101 76	
Frontenac	Portsmouth	....	....	1	....	....	....	....	3	4	....	360 00	365 00	....	68 52	64 62	Can. Temp. Act in force in 1888-9.
	Kingston	....	1	1	....	....	....	....	4	5	....	275 00	365 00	....	70 42	85 58	
	Portland	....	....	1	....	....	....	....	5	6	....	450 00	475 00	....	114 20	113 52	
	Pittsburgh	....	....	....	....	....	....	....	3	4	....	270 00	307 50	....	68 52	73 36	
	Storrington	....	....	....	....	....	....	....	2	2	....	230 00	177 50	....	64 72	48 90	
	Wolfe Island	....	....	....	....	....	....	....	4	4	....	288 75	288 75	....	74 24	68 11	
	Loughboro'	....	1	1	....	....	....	....	3	3	....	185 00	185 00	....	47 58	43 66	
	Bedford	....	....	1	....	....	....	....	2	3	....	127 50	205 00	....	34 26	50 64	

SCHEDULE C—Comparative Statement by Municipalities, shewing the Number of Provincial Licenses, etc.—*Continued.*

License District.	MUNICIPALITY.	Tavern.						Shop.			Wholesale.			Extended Tavern.			Extended Shop.			Six months.		
		Ordinary.			Beer and Wine.																	
		1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-91.
Glengarry	Alexandria	5	5	5	....	....	....	1	2	2	....	....	....	....	....	....	....	....	....	....	....	....
	Charlottenburg	6	6	7	....	....	....	1	1	1	....	....	....	....	....	....	....	....	....	....	....	1
	Lancaster, Township	7	6	4	....	....	....	1	1	1	....	....	....	....	....	....	....	....	....	....	....	....
	Kenyon	7	8	7	....	....	....	....	....	....	....	....	....	....	2	....	....	....	....	....	....	....
	Lochiel	4	5	6	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Lancaster, Village	....	2	2	....	....	....	....	....	....	....	....	....	....	1	....	....	....	....	....	....	....
Grenville	Prescott	....	9	8	....	....	....	....	2	2	....	....	....	....	....	1	....	....	....	....	....	....
	Cardinal	....	2	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Kemptville	....	4	4	....	....	....	....	1	1	....	....	....	....	....	....	....	....	....	....	....	....
	Merrickville	....	3	3	....	....	....	....	....	....	....	....	....	....	....	1	....	....	....	....	....	....
	Augusta	....	3	3	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Wolford	....	1	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Kitley	....	5	5	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	South Elmsley	....	2	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Oxford	....	3	3	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Centre Grey	Thornbury	2	2	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Artemesia	4	5	5	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Holland	6	6	6	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Collingwood, Township	3	3	1	1	1	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Euphrasia	1	1	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Osprey	5	5	5	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Sullivan	3	2	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Markdale	3	3	3	....	....	....	1	1	1	....	....	....	....	....	....	....	....	....	....	....	....

SCHEDULE C—*Continued.*

License District.	MUNICIPALITY.	Licenses Transferred and Removed.						Total.			Amount received for Provincial Licenses, Transfers, Removals, and Fines in each Municipality.			Proportion thereof paid to Municipalities.			REMARKS.
		Transfers.			Removals.												
		1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889 90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889 90.	1890-1.	
											$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	
Glengarry	Alexandria	1	2	....	....	....	....	7	9	7	725 00	880 00	890 00	164 33	206 80	213 28	
	Charlottenburg	....	...	2	1	....	....	8	7	11	785 00	950 00	1965 50	258 92	453 77	517 54	
	Lancaster, Township	....	...	....	....	....	....	8	7	5	790 00	720 00	750 00	247 66	266 26	436 14	
	Kenyon	....	....	....	....	....	....	7	10	7	630 00	1305 00	1100 00	189 11	752 80	633 30	
	Lochiel	....	1	....	....	....	....	5	6	6	490 00	605 00	720 00	153 08	287 12	343 36	
	Lancaster, Village	....	....	....	....	....	....	....	3	2	....	450 00	400 00	....	242 24	214 45	
Grenville	Prescott	....	1	1	....	....	....	....	12	12	....	3045 00	2952 50	....	1781 98	1700 81	Can. Temp. Act. in force in 1888-9.
	Cardinal	....	....	..	....	....	....	....	2	2	....	400 00	400 00	....	218 04	216 22	
	Kemptville	....	2	....	....	....	....	....	7	5	....	990 00	940 00	....	468 02	459 28	
	Merrickville	....	....	....	....	....	....	....	3	4	....	595 00	502 00	....	270 44	222 64	
	Augusta	....	....	....	....	....	....	....	3	3	....	270 00	270 00	....	87 08	84 32	
	Wolford	....	....	....	....	....	....	....	1	1	....	200 00	220 00	....	139 02	147 48	
	Kitley	....	....	....	....	....	....	....	5	5	....	500 00	470 00	....	169 32	149 92	
	South Elmsley	....	....	....	....	....	....	....	2	2	....	180 00	180 00	....	58 06	56 22	
	Oxford	....	1	1	....	....	....	....	4	4	....	275 00	295 00	....	89 50	96 02	
Centre Grey	Thornbury	....	....	2	....	....	....	2	2	4	340 00	300 00	310 00	96 46	74 04	73 98	
	Artemesia	1	2	....	....	....	....	6	7	5	402 50	480 00	450 00	132 68	152 70	130 56	
	Holland	....	...	....	....	....	....	6	6	6	600 00	580 00	540 00	202 59	185 08	156 68	
	Collingwood, Township	1	....	....	....	....	....	5	4	3	312 50	307 50	165 00	103 72	97 16	52 22	
	Euphrasia	....	..	....	....	....	....	1	1	1	110 00	90 00	90 00	38 60	27 76	26 12	
	Osprey	....	1	1	....	....	....	5	6	6	450 00	455 00	455 00	144 72	141 12	132 74	
	Sullivan	1	....	....	....	....	....	4	2	2	315 00	230 00	180 00	108 54	78 66	52 24	
	Markdale	2	2	....	....	1	....	6	7	4	580 00	615 00	500 00	164 02	237 98	113 16	

SCHEDULE C.—Comparative Statement by Municipalities, shewing the number of Provincial Licenses, etc.—*Continued.*

License District.	MUNICIPALITY.	Tavern.						Shop.			Wholesale.			Extended Tavern.			Extended Shop.			Six months.		
		Ordinary.			Beer and Wine.																	
		1888-9.	1889-90.	1890-91.	1888-9.	1889-90.	1890-91.	1888-9.	1889-90.	1890-91.	1888-9.	1889-90.	1890-91.	1888-9.	1889-90.	1890-91.	1888-9.	1889-90.	1890-91.	1888-9.	1889-90.	1890-91.
North Grey.	Owen Sound	+12	12	12	....	....	....	2	2	2	....	....	....	....	....	....	....	....	....	1	1	....
	Meaford	5	5	4	1	*1	1	1	1	1	....	....	....	....	....	....	....	....	....	....	....	....
	Derby	2	2	2	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Keppell	2	2	1	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Sydenham	3	3	3	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	St. Vincent	1	1	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Sarawak	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
South Grey.	Proton	2	3	3	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Durham	4	4	4	....	....	....	2	1	1	....	....	....	....	....	....	....	....	....	....	....	....
	Bentinck	5	5	5	....	....	....	1	1	1	....	....	....	....	....	....	....	....	....	....	....	....
	Glenelg	3	3	3	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Normanby	8	10	10	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Egremont	2	2	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Dundalk	3	3	3	....	....	....	....	....	....	....	....	....	....	....	....	1	....	....	....	....	....
Haldimand.	Cayuga, Village	5	4	5	....	....	....	1	1	1	....	....	....	....	....	....	....	....	....	....	....	....
	Caledonia	3	3	4	1	1	....	1	1	1	....	....	....	....	....	....	....	....	....	....	....	....
	Oneida	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Cayuga, North, Tp	4	3	5	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Dunn	2	3	3	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1	....	....
	Rainham	4	4	4	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Walpole	6	7	7	1	2	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Seneca	4	3	3	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Hagersville	4	4	5	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....

SCHEDULE C.—*Continued.*

License District.	MUNICIPATITY.	Licenses Transferred and Removed.						Total.			Amounts received for Provincial Licenses, Transfers, Removals and Fines in each Municipality.			Proportion thereof paid to Municipalities.			REMARKS.
		Transfers.			Removals.												
		1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	
											$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	
North Grey.	Owen Sound	2	2	3	....	....	....	17	17	17	2775 50	2913 50	2884 00	1063 14	1137 83	1114 38	
	Meaford	....	1	....	....	....	....	7	8	6	1107 50	1112 50	963 50	410 66	414 98	359 21	
	Derby	....	1	....	....	....	....	3	3	2	337 50	185 00	400 00	135 34	63 08	167 24	
	Keppell	1	....	....	....	....	....	4	3	1	232 50	180 00	90 00	82 73	61 59	29 50	
	Sydenham	....	....	....	....	....	....	3	3	3	290 00	300 00	310 00	100 26	106 03	108 20	
	St. Vincent	....	....	1	....	....	....	1	1	2	90 00	90 00	95 00	30 07	30 30	31 98	
	Sarawak	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	
South Grey.	Proton	....	....	....	....	....	....	2	3	3	202 00	270 00	270 00	67 52	91 06	91 01	
	Durham	....	2	....	....	....	....	6	7	5	1160 00	930 00	960 00	488 32	385 58	392 47	
	Bentinck	1	....	....	....	....	....	7	6	6	545 00	540 00	580 00	173 60	176 08	202 24	
	Glenelg	....	....	....	....	....	....	3	3	3	270 00	270 00	270 00	85 60	116 03	91 00	
	Normanby	....	....	....	....	....	....	8	10	10	834 00	950 00	900 00	282 55	332 28	303 36	
	Egremont	1	....	....	....	....	....	3	2	2	185 00	220 00	180 00	59 46	83 46	60 67	
	Dundalk	....	....	....	....	....	....	4	3	3	583 50	560 00	620 00	270 00	269 68	296 62	
	Refunds	....	....	....	....	....	....	....	....	...	....	....	36 35	....	....	....	
Haldimand.	Cayuga, Village	2	....	3	....	....	....	8	5	9	850 00	720 00	905 00	305 66	249 32	335 31	
	Caledonia	....	....	....	....	....	....	5	5	5	825 00	825 00	900 00	435 46	426 00	451 98	
	Oneida	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	
	Cayuga, North, Tp	....	....	....	....	....	....	4	3	5	360 00	270 00	470 00	120 44	84 00	162 12	
	Dunn	....	....	....	....	....	....	3	3	3	225 00	270 00	270 00	75 26	84 00	91 20	
	Rainham	....	....	....	....	....	....	4	4	4	360 00	380 00	390 00	120 42	120 87	136 79	
	Walpole	3	....	2	....	....	....	10	9	11	642 50	705 00	735 00	228 32	224 00	258 36	
	Seneca	....	1	....	....	....	....	4	4	3	440 00	335 00	330 00	200 42	146 32	151 18	
	Hagersville	....	....	....	....	....	....	4	4	5	530 00	480 00	600 00	145 52	112 00	151 98	

*One Beer and Wine Vessel Issued.
†Not including four, Vessel, Great Lakes.

Schedule C.—Comparative Statement by Municipalities shewing the number of Provincial Licenses, etc.—*Continued.*

License District.	Municipality.	Tavern.						Shop.			Wholesale.			Extended Tavern.			Extended Shop.			Six Months.		
		Ordinary.			Beer and Wine.																	
		1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888 9.	1889-90.	1890-1.	1888-9.	1889-90	1890-1.
Haliburton..	Minden	2	2	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Dysert	2	2	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Anson	1	1	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Sherban	1	1	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Glamorgan	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Snowdon	....	1	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Halton	Nelson	2	1	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Nassagaweya	1	1	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Esquesing	5	5	5	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Burlington	3	3	3	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Georgetown	4	4	4	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Oakville	4	5	5	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Milton	3	3	3	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Acton	3	3	3	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Trafalgar	3	3	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Hamilton	Hamilton, City	109	90	92	2	1	....	37	38	38	2 1 Ex.	3	3	....	19	4	..	....	....	....	1 B&W	1 B&W
East Hastings..	Tyendinaga	8	9	9	....	....	....	....	....	....	....	....	....	1	....	....	....	....	....	....	....	....
	Hungerford	8	8	8	....	....	....	2	1	1	....	....	....	....	....	....	....	....	....	....	....	....
	Thurlow	7	7	6	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Deseronto	5	5	5	....	....	....	1	2	2	....	....	....	....	....	....	....	....	....	....	....	....

SCHEDULE C.—*Continued.*

License District.	MUNICIPALITY.	Licenses Transferred and Removed.						Total.			Amounts received for Provincial Licenses, Transfers, Removals, and Fines in each Municipality.			Proportion thereof paid to Municipalities.			REMARKS.
		Transfers.			Removals.												
		1888-9.	1889-90.	1890-91.	1888-9.	1889-90.	1890-91.	1888-9.	1889-90.	1890-91.	1888-9.	1889-90.	1890-91.	1888-9.	1889-90.	1890-91.	
											$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	
Haliburton.	Minden	1	1	1	....	....	....	3	3	3	185 00	185 00	185 00	41 79	48 24	44 69	
	Dysert	....	....	....	....	....	....	2	2	2	190 00	180 00	180 00	43 46	46 31	42 90	
	Anson	1	....	1	....	....	....	2	1	2	95 00	90 00	95 00	21 74	23 16	23 24	
	Sherban	....	....	....	....	....	....	1	1	1	90 00	90 00	90 00	20 00	23 16	21 46	
	Glamorgan	....	....	....	....	....	....	....	....	....	....	50 00	....	....	19 29	......	
	Snowdon	....	....	....	....	....	....	....	1	1	....	90 00	90 00	....	23 14	21 44	
Halton	Nelson	....	....	....	....	....	....	2	1	1	180 00	120 00	120 00	54 11	56 78	55 96	
	Nassagaweya	....	....	....	....	....	....	1	1	1	90 00	160 00	100 00	27 04	58 03	30 28	
	Esquesing	2	1	....	....	....	....	7	6	5	510 00	535 00	500 00	189 80	199 52	179 77	
	Burlington.	....	1	....	....	....	.	3	4	3	480 00	545 00	540 00	201 17	262 58	257 86	
	Georgetown	1	1	1	....	....	....	5	5	5	525 00	805 00	705 00	150 49	340 78	291 94	
	Oakville	1	....	...	....	....	....	5	5	5	685 00	850 00	850 00	226 59	278 52	273 04	
	Milton	....	....	1	....	..	....	3	3	4	570 00	590 00	575 00	228 24	236 04	225 98	
	Acton	1	....	....	....	....	....	4	3	3	410 00	585 00	535 00	128 45	305 34	238 68	
	Trafalgar	1	....	....	....	....	....	4	3	2	310 00	300 00	200 00	107 45	110 35	71 92	
Hamilton	Hamilton, City	44	23	21	7	4	9	202	179	168	47169 50	42521 25	41968 75	16864 67	15227 74	14748 95	
East Hastings.	Tyendinaga	....	1	1	....	....	....	9	10	10	765 00	835 00	859 00	223 50	264 12	264 87	
	Hungerford	4	....	2	....	....	....	14	9	11	980 00	950 00	1175 00	297 98	317 88	580 32	
	Thurlow	....	1	....	....	....	..	7	8	6	630 00	635 00	540 00	784 05	198 66	161 90	
	Deseronto	1	1	2	....	....	....	7	8	9	1445 00	1995 00	1900 00	868 71	1150 87	1096 32	

SCHEDULE C.—Comparative Statement by Municipalities, shewing the number of Provincial Licenses, etc.—*Continued.*

License District.	MUNICIPALITY.	Tavern.						Shop.			Wholesale.			Extended Tavern.			Extended Shop.			Six Months.		
		Ordinary.			Beer and Wine.																	
		1888-9.	1889-90.	1890-1.	1888 9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.
North Hastings..	Marmora and Lake	3	4	4				1	1	1												
	Huntingdon	2	2	2																		
	Stirling	3	3	3				1	1	1												
	Madoc, Township	2	2	2	1																	
	Elzevir & Grimsthorpe	2	2	2																		
	Tudor and Cashell	4	4	4																		
	Wollaston																					
	Monteagle and Herschel	1	2	2	1																	
	Rawdon	3	3	4																		
	Madoc, Village	3	3	3				2	2	1												
	Wicklow and Bangor	1	1	1																		
	Dungannon & Faraday						1															
	Carlow and Mayo																					
	Limerick	1	2	2																		
West Hastings..	Belleville	25	25	25				4	3	3	3	2	2	3								
	Trenton	10	10	10				2	2	2				2		1						
	Sidney	6	6	6																		
East Huron	Grey	6	6	7																		
	McKillop	3	3	3																		
	Hullett, East part	1	1																			
	Morris	2	2	2																		
	Howick	7	7	5																		
	Turnberry	1	1	1																		
	Brussels	4	4	4																		
	Wroxeter	2	2	2																		

SCHEDULE C.—*Continued.*

License District.	Municipality.	Licenses Transferred and Removed.						Total.			Amounts received for Provincial Licenses, Transfers Removals, and Fines in each Municipality.			Proportion thereof paid to Municipalities.			Remarks.
		Transfers.			Removals.												
		1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	
											$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	
North Hastings..	Marmora and Lake....	1	....	2	....	....	....	5	5	7	385 00	470 00	480 00	113 92	141 70	154 18	
	Huntingdon	1	....	....	....	....	....	3	2	2	185 00	180 00	180 00	53 74	53 12	56 06	
	Stirling	2	....	1	....	....	..	6	4	5	530 00	520 00	525 00	147 48	146 28	154 48	
	Madoc, Township	...	....	...	....	....	....	3	2	2	217 50	200 00	180 00	64 50	62 00	56 06	
	Elzevir & Grimsthorpe.	....	....	....	....	....	....	2	2	2	180 00	180 00	180 00	51 58	53 12	56 06	
	Tudor and Cashell.....	....	....	1	....	....	....	4	4	5	360 00	360 00	365 00	103 17	106 28	114 50	
	Wollaston	....	....	....	....	....	....	....	....	....	......	......	......	......	......	......	
	Monteagle and Herschel	1	....	...	....	....	....	3	2	2	132 50	180 00	180 00	40 84	53 14	56 06	
	Rawdon	2	....	....	....	....	....	5	3	4	280 00	290 00	360 00	81 68	88 56	112 14	
	Madoc, Village	....	2	2	....	....	....	5	7	6	800 00	810 00	650 00	328 96	337 28	276 82	
	Wicklow and Bangor ..	1	1	....	....	....	....	2	2	1	95 00	95 00	90 00	27 94	28 77	28 04	
	Dungannon & Faraday.	....	....	....	....	....	....	...	....	1	......	......	37 50	......	......	14 02	
	Carlow and Mayo......	....	....	....	....	....	....	....	..	....	......	......	......	......	......	......	
	Limerick	....	....	....	....	..	....	1	2	2	90 00	180 00	180 00	25 80	53 14	56 06	
West Hastings..	Belleville...............	7	10	5	....	....	....	42	40	35	8702 50	7740 00	7935 00	3437 20	3121 09	3179 20	
	Trenton	5	3	2	2	1	1	21	16	16	3109 85	3074 80	2924 17	1586 15	1587 86	1501 71	
	Sidney	....	1	2	...	...	....	6	7	8	550 00	545 00	550 00	176 94	179 78	178 08	
East Huron	Grey	....	2	4	....	2	1	6	10	12	550 00	640 00	685 00	135 30	182 90	150 77	
	McKillop	....	....	....	....	....	....	3	3	3	270 00	270 00	270 00	65 82	71 56	60 00	
	Hullett, East part	1	....	....	....	....	....	2	1	....	95 00	110 00	......	23 78	31 80	......	
	Morris	....	....	1	...	....	....	2	2	3	180 00	180 00	185 00	43 88	47 71	40 55	
	Howick	2	....	....	....	....	....	9	7	5	640 00	630 00	510 00	157 22	166 98	116 74	
	Turnberry	....	....	....	....	....	....	1	1	1	90 00	90 00	90 00	21 94	23 86	20 00	
	Brussels	....	1	....	....	....	1	4	5	5	680 00	675 00	655 00	262 38	269 34	242 70	
	Wroxeter....	....	. ..	1	....	....	....	2	2	3	320 00	320 00	355 00	123 86	127 70	130 25	

SCHEDULE C.—Comparative Statement by Municipalities, shewing the number of Provincial Licenses, etc.—*Continued.*

License District.	MUNICIPALITY.	Tavern.						Shop.			Wholesale.			Extended Tavern.			Extended Shop.			Six Months.		
		Ordinary.			Beer and Wine.																	
		1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.
South Huron	Exeter	4	5	5	....	....	....	1	1	2	....	....	....	....	....	....	....	....	....	....	....	....
	Seaforth	7	7	7	....	....	....	2	2	2	....	....	....	....	....	....	....	....	....	....	....	....
	Goderich, T'ship, S. pt.	1	1	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Bayfield	2	2	2	....	....	....	2	1	....	....	....	....	....	....	....	....	....	....	1	1	1
	Stephen	10	8	9	....	2	....	1	1	....	....	....	....	....	....	....	....	....	....	....	....	....
	Usborne	4	4	3	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Hay	6	6	6	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Tuckersmith	3	3	3	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Stanley	4	3	3	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
West Huron	Goderich, Town	8	8	8	....	....	....	2	2	1	....	....	....	....	....	....	....	....	....	....	....	....
	Wawanosh, East	1	1	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Hullett	2	2	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Wawanosh, West	2	2	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Wingham	6	6	6	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Clinton	8	8	8	....	....	....	1	1	1	....	....	....	....	....	....	....	....	....	....	....	....
	Ashfield	5	5	5	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Colborne	5	5	5	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1.B&W	1.B&W	....
	Blythe	4	4	4	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....
East Kent	Howard	....	2	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Blenheim	....	3	3	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Dresden	....	4	4	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Thamesville	....	3	3	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Camden	....	1	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Bothwell	....	3	3	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Harwich	....	10	8	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Orford	....	4	3	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Ridgetown	....	4	4	....	....	....	....	1	1	....	....	....	....	....	....	....	....	....	....	....	....

SCHEDULE C.—*Continued.*

License District.	MUNICIPALITY.	Licenses Transferred and Removed.						Total.			Amounts received for Provincial Licenses, Transfers, Removals, and Fines in each Municipality.			Proportion thereof paid to Municipalities.			REMARKS.
		Transfers.			Removals.												
		1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	
											$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	
South Huron	Exeter	1	1	2	....	...	....	6	7	9	830 00	990 00	1180 00	391 24	458 72	550 04	
	Seaforth	3	2	2	....	....	....	12	11	11	1910 00	1955 00	1865 00	927 49	940 18	878 57	
	Goderich, T'ship, S. pt.	....	....	1	....	....	....	1	1	2	90 00	90 00	95 00	32 71	31 84	33 26	
	Bayfield	....	....	1	1	....	....	6	4	4	545 00	430 00	325 00	149 90	116 76	89 55	
	Stephen	1		....	...	....	....	12	11	9	995 00	905 00	840 00	362 51	329 06	291 70	
	Usborne	....	....	....	....	....	..	4	4	3	360 00	360 00	270 00	130 84	127 36	92 12	
	Hay	4	3	2	....	....	....	10	9	8	604 00	605 00	580 00	231 19	225 56	204 68	
	Tuckersmith	....	...	....	....	....	....	3	3	3	270 00	280 00	270 00	98 14	100 84	92 12	
	Stanley	....	1	1	....	....	....	4	5	4	360 00	352 50	455 00	130 80	154 10	201 44	
West Huron	Goderich, Town	2	....	1	....	....	....	12	10	10	1960 00	1950 00	1760 00	891 78	864 84	775 06	
	Wawanosh, East	....	....	....	....	..	....	1	1	1	90 00	90 00	90 00	32 77	31 10	30 62	
	Hullett	....	1	....	....	....	....	2	3	2	180 00	185 00	180 00	65 41	64 82	61 26	
	Wawanosh, West	....	....	1	....	....	....	2	2	2	180 00	200 00	95 00	65 46	72 60	33 18	
	Wingham	....	....	1	....	....	....	7	6	7	170 00	1040 00	985 00	402 71	350 40	317 78	
	Clinton	4	2	2	....	....	....	13	11	11	1800 00	1885 00	1855 00	742 65	845 78	823 55	
	Ashfield	1	....	2	....	....	....	6	5	7	1455 00	470 00	460 00	166 42	165 92	158 24	
	Colborne	1	....	...	....	....	....	7	6	5	523 75	518 75	530 00	201 78	189 28	193 96	
	Blythe	2	....	1	....	....	.. .	7	4	5	795 00	580 00	755 00	304 06	214 82	321 62	
East Kent	Howard	....	....	....	....	....	....	....	2	2	....	230 00	210 00	....	83 18	65 18	Cau. Temp. Act in force in 1888-9.
	Blenheim	....	..	....	....	....	....	....	3	3	....	860 00	840 00	....	501 90	477 30	
	Dresden	....	1	....	....	..	....	....	5	4	....	1215 00	1200 00	....	702 62	671 14	
	Thamesville	...	....	....	....	....	....	....	3	3	....	450 00	450 00	....	178 06	168 20	
	Camden	....	....	....	....	....	....	....	1	2	....	140 00	180 00	....	53 82	52 12	
	Bothwell	..	1	1	....	....	1	....	4	5	....	665 00	670 00	....	329 87	318 60	
	Harwich	....	....	2	....	..	....	....	11	10	....	1365 00	1030 00	....	648 76	456 30	
	Orford	....	1	....	....	....	....	....	4	3	....	410 00	340 00	....	141 88	108 60	
	Ridgetown	....	2	3	....	....	1	....	7	9	....	1370 00	1330 00	....	774 84	731 14	

SCHEDULE C.—Comparative Statement by Municipalities, shewing the number of Provincial Licenses, etc.—*Continued.*

License District.	MUNICIPALITY.	Tavern.						Shop.			Wholesale.			Extended Tavern.			Extended Shop.			Six Months.		
		Ordinary.			Beer and Wine.																	
		1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.
West Kent	Chatham, Town	....	21	21	....	....	....	....	3	3	....	....	....	....	....	....	....	....	....	....	....	....
	Chatham, Township	....	3	3	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Dover	....	5	5	....	....	....	....	....	....	....	....	....	....	....	1	....	....	....	....	....	....
	Wallaceburg	....	7	7	....	....	....	....	2	2	....	....	....	....	....	....	....	....	....	....	....	....
	Raleigh	....	2	3	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Tilbury, Centre	....	....	4	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Tilbury, East	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Kingston	Kingston, City	*43	†39	38	1	1	....	15	15	15	1	1	1	....	2	....	1	....	....	....	....	2 B.& W.
East Lambton.	Bosanquet	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1 B.& W.
	Forest	....	4	4	....	....	....	....	1	1	....	....	....	....	....	....	....	....	....	....	....	....
	Warwick	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Brooke	....	2	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Wyoming	....	3	3	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Watford	....	4	4	....	....	....	....	2	2	....	....	....	....	....	....	....	....	....	....	....	....
	Euphemia	....	3	3	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Plympton	....	1	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Arkona	....	2	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Thedford	....	1	1	....	....	....	....	1	1	....	....	....	....	....	....	....	....	....	....	....	....
	Alvinston	....	4	4	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
West Lambton.	Petrolia	....	6	6	....	....	....	....	2	2	....	....	....	....	....	....	....	....	....	....	....	....
	Moore	....	6	7	....	....	....	....	1	1	....	....	....	....	....	....	....	....	....	....	....	....
	Sarnia, Township	....	1	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1
	Sombra	....	6	8	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Oil Springs	....	4	4	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Enniskillen	....	3	3	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Sarnia, Town	....	8	9	....	....	....	....	2	3	....	....	....	....	....	....	....	....	....	....	....	....
	Point Edward	....	5	5	....	1	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Dawn	....	....	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....

SCHEDULE C.—*Continued.*

License District.	MUNICIPALITY.	Licenses Transferred and Removed.						Total.			Amount received for Provincial Licenses, Transfers, Removals, and Fines in each Municipality.			Proportion thereof paid to Municipalities.			REMARKS.
		Transfers.			Removals.												
		1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889 90.	1890-1.	
											$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	
West Kent.	Chatham, Town	....	1	5	....	....	....	....	25	29	....	9939 00	10095 00	....	5516 74	5624 44	Can. Temp. Act in force in 1888-9.
	Chatham, Township	....	1	1	....	....	....	....	4	4	....	275 00	275 00	....	87 87	94 80	
	Dover	...	2	2	....	....	....	....	7	8	....	635 00	651 00	....	269 75	291 16	
	Wallaceburg	....	2	3	....	....	....	....	11	12	....	1690 00	1846 90	....	861 24	962 25	
	Raleigh	....	....	....	....	....	....	....	2	3	....	500 00	470 00	....	326 50	282 49	
	Tilbury, Centre	...	....	2	....	....	....	....	....	6	....	....	670 00	....	....	278 86	
	Tilbury, East	....	....	....	....	....	....	....	....	....	....	....	100 00	....	....	51 24	
Kingston	Kingston, City	1	3	7	....	1	....	62	62	63	17496 50	18464 00	16950 00	7675 02	9002 36	8666 39	
East Lambton.	Bosanquet	....	....	....	....	....	....	....	....	1	....	....	73 75	....	....	61 95	Can. Temp. Act in force in 1888-9.
	Forest	....	....	1	....	....	....	....	5	6	....	1000 00	1005 00	....	447 53	437 81	
	Warwick	....	....	....	....	....	....	....	1	....	....	220 00	....	....	134 32	....	
	Brooke	....	....	....	....	....	....	....	2	1	....	400 00	200 00	....	279 26	137 84	
	Wyoming	....	1	1	....	....	....	....	4	4	....	625 00	605 00	....	341 24	325 78	
	Watford	....	2	1	....	....	....	....	8	7	....	1110 00	1085 00	....	562 72	491 74	
	Euphemia	....	....	....	....	....	....	....	3	3	....	300 00	300 00	....	118 90	113 50	
	Plympton	....	....	....	....	....	....	....	1	1	....	160 00	160 00	....	99 62	97 84	
	Arkona	....	....	....	....	....	....	....	2	2	....	310 00	350 00	....	129 25	165 66	
	Thedford	....	....	....	....	....	....	....	2	2	....	435 00	295 00	....	234 01	99 92	
	Alvinston	....	1	....	....	....	....	....	5	4	....	805 00	910 00	....	440 98	482 32	
West Lambton.	Petrolia	....	....	3	....	....	....	....	8	11	....	2180 00	2435 00	....	1310 12	1452 03	Can. Temp. Act in force in 1888-9.
	Moore	....	2	2	....	....	....	....	9	10	....	805 00	910 00	....	364 95	434 24	
	Sarnia, Township	....	....	1	....	....	....	....	1	3	....	100 00	155 00	....	42 00	66 10	
	Sombra	....	....	4	....	....	....	....	6	12	....	560 00	820 00	....	201 56	348 87	
	Oil Springs	....	....	....	....	....	....	....	4	4	....	870 00	800 00	....	484 45	149 06	
	Enniskillen	....	1	....	....	....	....	....	4	3	....	295 00	270 00	....	108 74	96 80	
	Sarnia, Town	....	1	1	....	....	....	....	11	13	....	2865 00	3365 00	....	1710 26	2023 44	
	Point Edward	....	....	1	....	....	....	....	6	8	....	1515 00	1625 00	....	1053 50	1106 04	
	Dawn	....	....	....	....	....	....	....	....	2	....	....	300 00	....	....	184 52	

*Five Vessel Ordinary Licenses and two Beer and Wine not included †Four Ordinary and three Beer and Wine Vessel not included.

SCHEDULE C.—Comparative Statement by Municipalities, shewing the number of Provincial licenses, etc.—*Continued.*

License District.	MUNICIPALITY.	Tavern.						Shop.			Wholesale.			Extended Tavern.			Extended Shop.			Six Months.		
		Ordinary.			Beer and Wine.																	
		1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.
North Lanark...	Lanark Village	....	2	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Pakenham	....	3	3	....	....	....	....	1	1	....	....	....	....	....	....	....	....	....	....	....	....
	Dalhousie	....	2	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Almonte	....	4	5	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Carleton Place	....	6	8	....	....	....	....	1	2	....	....	....	....	....	....	....	....	....	....	....	....
	Ramsay	....	3	3	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Lanark, Township	....	....	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Lavant	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
South Lanark...	Perth	....	7	7	....	....	....	....	2	2	....	....	....	....	....	....	....	....	....	....	....	....
	Smith's Falls	....	6	6	....	....	....	....	2	2	....	....	....	....	....	....	....	....	....	....	....	....
	Beckwith	....	2	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Bathurst	....	1	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Drummond	....	2	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	South Sherbrooke	....	1	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....

SCHEDULE C.—*Continued.*

License District.	MUNICIPALITY.	Licenses Transferred and Removed.						Total.			Amount received for Provincial Licences, Transfers, Removals, and Fines in each Municipality.			Proportion thereof paid to Municipalities.			REMARKS.
		Transfers.			Removals.												
		1888-9.	1889-90.	1890-91.	1888-9.	1889-90.	1890-91.	1888-9.	1889-90.	1890-91.	1888-9.	1889-90.	1890-91.	1888-9.	1889-90.	1890-91.	
											$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	
North Lanark...	Lanark, Village								2	2		365 00	350 00		167 22	169 06	Can. Temp. Act in force in 1888-9.
	Pakenham.								4	4		360 00	360 00		101 74	118 12	
	Dalhousie.								2	2		220 00	180 00		90 87	59 06	
	Almonte								4	5		1210 10	1390 00		670 81	816 54	
	Carleton Place								7	10		2160 00	2900 00		1302 14	1692 18	
	Ramsay.								3	3		300 00	320 00		106 28	128 44	
	Lanark, Township.									2		130 00	225 00		55 10	81 20	
	Lavant									1			90 00			29 54	
South... Lanark...	Perth								9	9		2510 00	2510 00		1460 40	1455 05	Can. Temp. Act in force in 1888-9.
	Smith's Falls		4	5					12	13		2240 00	2205 00		1302 36	1281 14	
	Beckwith								2	2		230 00	180 00		80 82	56 26	
	Bathurst								1	1		90 00	90 00		28 52	28 12	
	Drummond								2	2		190 00	190 00		67 07	66 26	
	South Sherbrooke								1	1		110 00	95 00		48 54	33 12	

SCHEDULE C.—Comparative Statement by Municipalities, shewing the number of Provincial Licenses, etc.—*Continued.*

License District.	MUNICIPALITY.	Tavern.						Shop.			Wholesale.			Extended Tavern.			Extended Shop.			Six Months.		
		Ordinary.			Beer and Wine.																	
		1888-9.	1889-90.	1890-91.	1888-9.	1889-90.	1890-91.	1888-9.	1889-90.	1890-91.	1888-9.	1889-90.	1890-91.	1888-9.	1889-90.	1890-91.	1888-9.	1889-90.	1890-91.	1888-9.	1889-90.	1890-91.
Lennox	Napanee	....	8	8	....	....	....	....	3	2	....	....	....	....	....	....	....	....	1	....	....	....
	Bath	....	....	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Adolphustown	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1	....
	Amherst Island	....	2	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Ernestown	....	2	3	....	....	....	....	....	....	....	....	....	....	1	....	....	....	....	....	....	....
	North Fredericksburgh	....	....	..	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Richmond	....	1	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Lincoln	Niagara, Township	....	1	3	....	3	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Grimsby, Township	....	2	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Grantham	....	3	3	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Merritton	....	5	4	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Louth	....	2	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Port Dalhousie	....	4	4	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1	1
	Clinton	....	....	1	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Grimsby, Village	....	3	3	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Niagara, Town	....	5	5	....	....	....	....	2	2	....	....	....	....	....	....	....	....	....	....	1	1
	Beamsville	....	3	3	....	....	....	....	1	1	....	....	....	....	....	....	....	....	....	....	....	....
London	London, City	51	52	54	6	6	2	14	13	12	1	1	1	....	....	2 & 2B&W.	....	....	1	....	....	....

SCHEDULE C.—*Continued.*

License District.	Municipality.	Licenses Transferred and Removed.						Total.			Amounts received for Provincial Licenses, Transfers, Removals, and Fines in each Municipality.			Proportion thereof paid to Municipalities.			Remarks.
		Transfers.			Removals.												
		1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	
Lennox	Napanee	....	4	2	....	....	....	....	15	13	....	2996 00	2937 50	.. ....	1659 99	1595 74	Can. Temp. Act in force in 1888-9.
	Bath	....	....	....	....	....	....	....	2	2	....	260 00	240 00	....	52 48	44 33	
	Adolphustown	....	....	....	....	...	....	....	1	..	....	45 00	50 00	....	11 24	18 47	
	Amherst Island	....	1	....	....	....	....	....	3	2	....	185 00	180 00	....	46 84	44 33	
	Ernestown	....	....	1	....	....	....	....	3	4	....	245 00	275 00	.... ..	67 48	68 40	
	North Fredericksburg	....	-	....	..	....	....	....	...	....	....	.. .. ..	....	....	....	....	
	Richmond	....	....	....	....	....	....	....	1	1	....	90 00	90 00	....	22 50	22 17	
Lincoln	Niagara, Township	....	1	1	....	....	....	...	5	5	....	247 50	312 50	......	98 24	108 64	Can. Temp. Act in force in 1888-9.
	Grimsby, Township	....	1	....	....	....	....	....	3	2	....	245 00	240 00	....	122 98	120 64	
	Grantham	....	....	. ..	....	....	....	....	3	3	....	270 00	270 00	....	90 68	90 96	
	Merritton	....	2	1	....	....	....	....	7	5	....	1030 00	1023 00	....	566 24	553 96	
	Louth	....	....	....	....	....	....	....	2	2	....	210 00	180 00	....	75 57	60 64	
	Port Dalhousie	....	2	2	....	....	....	....	7	7	....	970 00	930 00	....	531 30	511 60	
	Clinton	....	....	....	....	....	....	....	1	1	....	57 50	160 00	....	35 12	75 59	
	Grimsby, Village	....	....	....	....	...	....	....	3	3	....	420 00	440 00	... .	150 68	161 07	
	Niagara, Town	....	1	....	....	1	....	....	10	8	....	1254 35	1285 00	....	367 45	384 08	
	Beamsville	....	1	....	....	1	....	....	6	4	....	570 00	560 00	....	205 96	201 28	
London	London, City	11	9	9	2	1	1	79	82	84	18933 83	18715 00	19297 76	5266 78	5060 20	5133 54	

SCHEDULE C.—Comparative Statement by Municipalities, shewing the number of Provincial Licenses, etc.—*Continued.*

License District.	MUNICIPALITY.	Tavern.						Shop.			Wholesale.			Extended Tavern.			Extended Shop.			Six Months.		
		Ordinary.			Beer and Wine.																	
		1888-9.	1889-90.	1890-91.	1888-9.	1889-90.	1890-91.	1888-9.	1889-90.	1890-91.	1888-9.	1889-90.	1890-91.	1888-9.	1889-90.	1890-91.	1888-9.	1889-90.	1890-91.	1888-9.	1889-90.	1890-91.
Manitoulin	Little Current	....	....	3	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Gore Bay	....	....	4	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Assignac	2	2	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Howland	3	4	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Gordon	3	4	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Tehkummah	1	1	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Billings	1	1	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Carnarvon	1	1	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Unorganized Territory	2	4	4	....	....	....	....	2	1	....	....	....	....	....	....	....	....	....	....	....	....
East Middlesex.	London, Township	....	11	18	....	1	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Dorchester	....	3	4	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Westminster	....	7	8	....	2	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Nissouri	....	1	1	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	London West, Village	....	2	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
North Middlesex.	East Williams	....	2	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	McGillivray	....	1	1	....	1	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Adelaide	....	1	1	....	1	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Biddulph	....	4	4	....	....	1	....	1	1	....	....	....	....	....	....	....	....	....	....	....	....
	Ailsa Craig	....	3	3	....	....	....	....	1	1	....	....	....	....	....	....	....	....	....	....	....	....
	Lobo	....	3	5	....	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Parkhill	....	4	5	....	1	....	....	2	2	....	....	....	....	....	....	....	....	....	....	....	....
	Lucan	....	4	4	....	....	....	....	1	1	....	....	....	....	....	....	....	....	....	....	....	....
	West Williams	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....

SCHEDULE C.—*Continued.*

License District.	MUNICIPALITY.	Licenses Transferred and Removed.						Total.			Amount received for Provincial Licenses, Transfers, Removals, and Fines in each Municipality.			Proportion thereof paid to Municipalities.			REMARKS.
		Transfers.			Removals.												
		1888-9.	1889-90.	1890 91.	1888-9.	1889-90.	1890-91.	1888-9.	1889-90.	1890-91.	1888-9.	1889-90.	1890-91.	1888-9.	1889-90.	1890-91.	
											$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	
Manitoulin.	Little Current	....	....	....	....	....	....	....	....	3	....	....	450 00	....	....	96 74	
	Gore Bay	....	....	....	....	....	....	....	....	4	....	....	600 00	....	....	128 97	
	Assignac	....	....	....	....	....	....	2	2	2	220 00	240 00	240 00	77 71	108 50	108 36	
	Howland	1	....	1	....	....	....	4	4	2	305 00	420 00	95 00	88 14	145 06	26 20	
	Gordon	2	....	....		....	....	5	4	....	280 00	360 00	....	59 68	96 98	....	
	Tehkummah	....	....	....	....	....	....	1	1	1	90 00	90 00	90 00	18 84	24 24	24 19	
	Billings	....	....	....	....	....	....	1	1	1	90 00	90 00	90 00	18 86	24 26	24 18	
	Carnarvon	....	....	....	....	....	....	1	1	1	160 00	90 00	90 00	40 84	24 26	24 19	
	Unorganized Territory	....	....	1	....	....	....	2	6	6	250 00	540 00	564 00	....	....	....	Payable wholly to the Province, less expenses.
East Middlesex.	London, Township	....	1	2	....	....	....	....	13	22	....	1232 50	1795 00	....	341 45	505 02	Can. Temp. Act in force in 1888-9.
	Dorchester	....	....	....	....	....	....	....	3	4	....	270 00	360 00	....	70 57	97 74	
	Westminster	....	1	....	....	....	....	....	10	10	....	710 00	845 00	....	194 06	240 30	
	Nissouri	....	....	....	....	....	....	....	1	2	....	90 00	127 50	....	26 29	36 66	
	London West, Village	....	....	2	....	....	....	....	2	4	....	240 00	360 00	....	48 44	162 95	
North Middlesex.	East Williams	....	....	....	....	....	....	....	2	2	....	180 00	180 00	....	53 40	51 86	Can. Temp. Act in force in 1888-9.
	McGillivray	....	....	....	....	....	....	....	2	2	....	127 50	127 50	....	40 05	38 90	
	Adelaide	....	1	....	....	....	....	....	3	2	....	132 50	127 50	....	42 30	38 88	
	Biddulph	....	1	1	....	....	....	....	6	7	....	505 00	607 50	....	185 73	248 42	
	Ailsa Craig	....	1	....	....	....	....	....	5	4	....	600 00	775 00	....	185 18	370 34	
	Lobo	....	1	1	....	....	....	....	6	6	....	400 00	455 00	....	131 28	131 80	
	Parkhill	....	....	....	....	....	....	....	7	7	....	1502 50	1315 00	....	765 30	484 31	
	Lucan	....	1	....	....	....	....	....	6	5	....	765 00	760 00	....	295 72	289 66	
	West Williams	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	

SCHEDULE C.—Comparative Statement by Municipalities, shewing the number of Provincial Licenses, etc.—*Continued.*

License District.	MUNICIPALITY.	Tavern.						Shop.			Wholesale.			Extended Tavern.			Extended Shop.			Six Months.		
		Ordinary.			Beer and Wine.																	
		1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.
West Middlesex	Ekfrid	....	4	4	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Strathroy	....	7	7	....	1	1	....	1	1	....	....	....	....	....	....	....	....	....	....	....	....
	Wardsville	....	2	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Metcalfe	....	....	2	....	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Delaware	....	2	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Caradoc	....	3	3	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Glencoe	....	4	4	....	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....
	Mosa	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Newbury	....	2	2	....	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....
Monck	Wainfleet	1	1	1	1	2	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Canborough	1	2	2	....	1	1	....	....	....	....	....	....	....	....	....	....	....	....	1B&W.	....	....
	Caistor	....	....	....	....	1	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Sherbrooke	1	1	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Dunnville	6	6	6	....	....	....	2	1	1	....	....	....	....	....	....	....	....	....	1	1	1
	Gainsborough	....	2	2	....	1	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Pelham	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Moulton	....	1	....	1	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....

SCHEDULE C.—*Continued.*

License District.	MUNICIPALITY.	Licenses Transferred and Removed.						Total.			Amounts received for Provincial Licenses, Transfers Removals, and Fines in each Municipality.			Proportion thereof paid to Municipalities.			REMARKS.
		Transfers.			Removals.												
		1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890 1.	1888-9.	1889-90.	1890-1.	
											$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	
West Middlesex	Ekfrid	....	1	....	....	....	..	....	5	4	....	415 00	360 00	....	129 50	99 20	Can. Temp. Ac force in 1888-9.
	Strathroy	....	1	3	....	....	1	....	10	13	....	1765 00	1895 00	....	797 59	833 53	
	Wardsville	.	....	....	....	....	....	....	2	2	....	300 00	300 00	....	112 68	109 60	
	Metcalfe	....	....	....	....	....	....	....	2	2	....	75 00	180 00	....	26 34	49 60	
	Delaware	....	1	....	..	....	....	...	3	2	....	185 00	180 00	....	54 88	49 60	
	Caradoc	....	1	....	....	....	...	....	4	3	....	275 00	270 00	....	81 21	74 42	
	Glencoe	....	....	....	....	....	....	....	5	4	....	1325 00	1095 00	....	842 66	681 94	
	Mosa	....	....	....	....	....	....	....	1	....	....	90 00	150 00	....	26 34	62 00	
	Newbury	....	....	....	....	....	....	....	3	2	....	475 00	300 00	....	194 02	109 60	
Monck	Wainfleet	....	2	....	....	...	....	2	5	3	127 50	175 00	165 00	29 24	42 50	34 20	
	Canborough	....	2	1	....	....	....	3	5	4	147 50	227 50	222 50	29 22	52 32	44 18	
	Caistor	....	....	1	....	....	....	....	1	3	....	37 50	80 00	......	9 81	18 52	
	Sherbrooke	....	....	....	....	....	..	1	1	1	90 00	90 00	90 00	19 50	19 62	17 10	
	Dunnville	....	1	1	....	....	....	9	9	9	1667 50	1407 50	1377 50	753 13	630 29	602 16	
	Gainsborough	....	....	1	....	....	....	....	3	4	....	217 50	222 50	....	49 04	41 18	Dunkin Act in force in 1888-9.
	Pelham	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	
	Moulton	....	....	....	....	....	....	1	1	1	37 50	140 00	37 50	9 74	35 98	8 54	

SCHEDULE C.—Comparative Statement by Municipalities, shewing the number of Provincial licenses, etc.—*Continued.*

License District.	MUNICIPALITY.	Tavern.						Shop.			Wholesale.			Extended Tavern.			Extended Shop.			Six Months.		
		Ordinary.			Beer and Wine.																	
		1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.
Muskoka...	McLean & Ridout		2	3																		
	Draper					1	1															
	Gravenhurst	4	3	3	1	1	1	1	1												2 and 3B&W.	
	Medora and Wood																			2 and 2B&W.		2 and 1B&W.
	Bracebridge		3	3		1	1		1	1												
	Huntsville	3	3	3																		
	Monck																			1 and 1B&W.	1	1
	Morrison	1	1	1																		
	Stisted						1															
	Stephenson		2	2																		
	McAuley		1			1	2															
Nipissing ..	North Bay							1	1	1												
	McKim	3	5	6				2	2	2									1			
	Mattawa	9	8	7				1	1	1												
	Widdifield	7	6	8											1							
	Springer	2	2	3																		
	Ferris																					
	Bonfield	2	2	3																		
North Norfolk ..	Middleton	5	4	5	2	3	2															
	Simcoe	8	8	8				3	3	2												
	Windham	1	3	4	1																	
	Waterford	3	3	3																		
South Norfolk ..	Walsingham, South	5	4	1				1														
	Woodhouse	1	2		1		1															
	Charlotteville	4	5	5		1														1		
	Houghton		1	1	2	1	1															
	Port Dover	4	4	4																1B&W.	1B&W.	1B&W.
	Walsingham, North		1	2		1																
	Port Rowan			2																		

SCHEDULE C—*Continued.*

License District.	MUNICIPALITY.	Licenses Transferred and Removed.						Total.			Amount received for Provincial Licenses, Transfers, Removals, and Fines in each Municipality.			Proportion thereof paid to Municipalities.			REMARKS.
		Transfers.			Removals.												
		1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889 90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889 90.	1890-1.	
											$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	
Muskoka...	McLean & Ridout	....	...	2	....	....	....	....	2	5	....	180 00	360 00	....	52 64	122 95	
	Draper	....	...	....	....	....	....	....	1	1	....	37 50	57 50	....	13 16	33 66	
	Gravenhurst	....	....	1	....	....	....	6	5	5	847 50	1050 00	805 00	246 49	494 26	422 28	
	Medora and Wood	....	....	....	....	....	....	4	5	3	127 50	146 25	183 50	42 22	46 06	108 91	
	Bracebridge	....	2	1	....	....	....	....	7	6	....	777 50	992 50	....	272 28	376 40	
	Huntsville	1	....	....	....	....	....	4	3	3	425 00	480 00	480 00	114 98	198 94	201 96	
	Monck	..	....	....	....	....	....	2	1	1	63 75	45 00	45 00	21 12	13 16	13 67	
	Morrison	....	....	....	....	....	....	1	1	1	90 00	90 00	90 00	28 14	26 32	27 34	
	Stisted	....	....	....	....	....	....	....	....	1	....	50 00	87 50	....	21 93	36 44	
	Stephenson	....	....	....	....	....	....	....	2	2	....	180 00	180 00	....	52 64	54 66	
	McAuley	....	....	1	....	....	....	....	2	3	....	127 50	180 00	....	39 48	75 14	
Nipissing ..	North Bay	....	...	1	....	....	....	....	....	1	....	....	125 00	....	....	99 64	
	McKim	....	...	2	....	....	....	4	6	10	585 00	1290 00	1550 83	346 96	941 06	1128 47	
	Mattawa	2	....	....	...	....	....	13	10	9	1660 00	1500 00	1370 00	1000 46	918 41	836 98	
	Widdifield	....	....	....	...	....	....	8	8	9	1250 00	1172 50	1350 00	749 32	710 99	792 00	
	Springer	....	....	....	....	....	....	2	2	3	360 00	360 00	540 00	240 96	243 68	365 18	
	Ferris	....	..	....	....	....	....	....	....	..	....	....	....	....	....	....	
	Bonfield	....	...	....	....	....	.	2	2	3	270 00	270 00	375 00	141 16	144 30	200 16	
	Unorganized Territory	....	....	....	....	....	...	....	....	....	....	....	50 00	....	....	.. .	Payable wholly to the Province less expenses.
North Norfolk ..	Middleton	1	4	3	....	....	....	8	11	10	580 00	536 50	540 00	162 60	161 43	158 24	
	Simcoe	1	1	3	....	1	....	12	13	13	1970 00	2275 00	2015 00	607 56	941 30	839 34	
	Windham	1	1	2	....	....	....	3	4	6	152 50	295 00	370 00	45 31	83 96	104 08	
	Waterford	1	....	....	....	....	....	4	3	3	485 00	550 00	500 00	194 34	222 44	203 30	
South Norfolk ..	Walsingham, South	....	1	1	....	....	....	6	5	2	540 00	385 00	95 00	132 69	80 00	17 76	
	Woodhouse	1	....	....	....	....	....	3	2	1	132 50	200 00	37 50	35 63	42 06	8 20	
	Charlotteville	....	...	....	....	....	....	5	6	5	545 00	607 50	470 00	151 06	117 57	87 42	
	Houghton	1	..	1	.. .	....	....	3	2	3	80 00	127 50	132 50	24 64	30 00	25 97	
	Port Dover	2	.. .	....	....	....	....	7	5	5	632 50	822 50	635 00	204 78	405 00	194 95	
	Walsingham, North	....	1	....	..	....	....	....	3	2	20 00	142 50	180 00	374 00	31 54	32 80	
	Port Rowan	....	....	1	....	.	....	....	....	3	....	....	245 00	....	....	34 17	

SCHEDULE C.—Comparative Statement by Municipalities, shewing the number of Provincial Licenses, etc.—*Continued.*

License District.	MUNICIPALITY.	Tavern.						Shop.			Wholesale.			Extended Tavern.			Extended Shop.			Six months.		
		Ordinary.			Beer and Wine.																	
		1888-9.	1889-90.	1890-91.	1888-9.	1889-90.	1890-91.	1888-9.	1889-90.	1890-91.	1888-9.	1889-90.	1890-91.	1888-9.	1889-90.	1890-91.	1888-9.	1889-90.	1890-91.	1888-9.	1889-90.	1890-91.
East Northumberland ..	Seymour	....	2	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Murray	....	2	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Cramahe	....	1	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Percy	....	2	2	....	....	....	....	1	1	....	....	....	....	....	....	....	....	....	....	....	....
	Colborne	....	3	3	....	....	....	....	2	1	....	....	....	....	....	....	....	....	....	....	....	....
	Campbellford	....	5	5	....	....	....	....	2	2	....	....	....	....	....	....	....	....	....	....	....	....
	Hastings	....	3	3	....	....		....	1	1	....	....	....	....	....	1	....	....	....	....	1	1
	Brighton, Village	....	2	3	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
West Northumberland ..	Alnwick	....	2	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1
	South Monaghan	....	1	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1	1
	Haldimand	....	3	1	....	....	....	....	....	....	....	....	....	....	....	1	....	....	....	....	....	....
	Hamilton	....	5	6	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1
	Cobourg, Town	....	13	11	....	1	....	....	4	4	....	....	....	....	....	1	....	....	....	....	1	1

SCHEDULE C.—*Continued.*

License District.	MUNICIPALITY.	Licenses Transferred and Removed.						Total.			Amount received for Provincial Licenses, Transfers, Removals, and Fines in each Municipality.			Proportion thereof paid to Municipalities.			REMARKS.
		Transfers.			Removals.												
		1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	
											$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	
East Northumberland ..	Seymour	....	....	....	....	....	....	....	2	2	....	180 00	180 00	....	45 67	44 46	Can. Temp. Act in force in 1888-9.
	Murray	....	1	....	....	....	....	....	3	1	....	185 00	90 00	....	47 58	22 24	
	Cramahe	....	....	1	....	....	....	....	1	2	....	130 00	135 00	....	62 83	64 08	
	Percy	....	1	....	....	....	....	....	4	3	....	515 00	430 00	....	298 04	207 80	
	Colborne	....	....	....	....	....	....	....	5	4	....	750 00	550 00	....	264 20	158 92	
	Campbellford	....	....	....	....	....	....	....	7	7	....	1130 00	1140 00	....	443 66	443 02	
	Hastings	....	....	....	....	....	....	....	5	6	....	790 00	1125 00	....	309 42	610 22	
	Brighton, Village	....	....	....	....	....	....	....	2	3	....	420 00	490 00	....	225 68	171 52	
West Northumberland ..	Alnwick	....	....	....	....	....	....	....	2	3	....	260 00	352 50	....	135 48	141 64	Can. Temp. Act in force in 1888-9.
	South Monaghan	....	....	....	....	....	....	....	2	2	....	135 00	135 00	....	41 60	39 06	
	Haldimand	....	1	....	....	....	....	....	4	2	....	275 00	112 50	....	85 52	32 54	
	Hamilton	....	1	....	....	....	....	....	6	7	....	505 00	690 00	....	191 00	251 60	
	Cobourg, Town	....	2	....	....	....	....	....	21	17	....	5042 50	4322 50	....	2950 40	2467 18	

SCHEDULE C.—Comparative Statement by Municipalities shewing the number of Provincial Licenses, etc.—*Continued.*

License District.	MUNICIPALITY.	Tavern.						Shop.			Wholesale.			Extended Tavern.			Extended Shop.			Six Months.		
		Ordinary.			Beer and Wine.																	
		1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.
North Ontario...	Uxbridge, Town	....	4	4	....	....	....	....	1	1	....	....	....	....	....	....	....	....	....	....	....	....
	Brock	....	4	4	....	1	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Mara	....	4	4	....	1	....	....	2	2	....	....	....	....	....	....	....	....	....	....	1	1
	Thorah	....	1	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Uxbridge, Township	....	3	3	....	2	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Scott	....	2	3	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Rama	....	2	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Cannington	....	2	3	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Beaverton	....	2	2	....	....	....	....	2	2	....	....	....	....	....	....	....	....	....	....	....	....
South Ontario...	Reach	....	6	4	....	....	....	....	....	....	....	....	....	....	....	2	....	....	....	....	....	....
	Oshawa	....	6	6	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Whitby, Town	....	7	7	....	....	....	....	1	1	....	....	....	....	....	....	....	....	....	....	....	....
	Whitby, Township	....	3	3	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Whitby, East, Township	....	1	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Pickering	....	8	8	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Port Perry	....	4	4	....	....	....	....	1	1	....	....	....	....	....	....	....	....	....	....	....	....

SCHEDULE C.—*Continued.*

License District.	MUNICIPALITY.	Licenses Transferred and Removed.						Total.			Amounts received for Provincial Licenses, Transfers, Removals, and Fines in each Municipality.			Proportion thereof paid to Municipalities.			REMARKS.
		Transfers.			Removals.												
		1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	
											$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	
North Ontario...	Uxbridge, Town	....	1	3	....	....	....	....	6	8	....	1015 00	1045 00	....	428 81	4447 78	Can. Temp. Act in force in 1888-9.
	Brock	....	....	....	....	....	....	....	5	5	....	440 00	512 50	....	162 46	205 03	
	Mara	....	2	3	....	....	....	....	10	10	....	632 50	660 00	....	191 05	237 27	
	Thorah	....	....	....	....	....	....	....	1	1	....	110 00	100 00	....	35 54	36 26	
	Uxbridge, Township	....	....	....	....	....	....	....	5	5	....	345 00	345 00	....	106 64	105 04	
	Scott	....	....	1	....	....	....	....	3	4	....	292 50	365 00	....	141 64	128 80	
	Rama	....	1	....	....	....	....	....	3	1	....	185 00	90 00	....	55 54	26 29	
	Cannington	....	1	....	....	....	....	....	3	3	....	405 00	690 00	....	215 54	358 18	
	Beaverton	....	....	1	....	....	....	....	4	5	....	640 00	645 00	....	266 62	267 23	
South Ontario...	Reach	....	1	1	....	....	....	....	7	7	....	605 00	505 00	....	242 16	205 28	Can. Temp. Act in force in 1888-9.
	Oshawa	....	....	....	....	....	....	....	6	6	....	1620 00	1640 00	....	959 56	966 58	
	Whitby, Town	....	1	1	....	....	....	....	9	9	....	1700 00	1730 00	....	804 41	815 22	
	Whitby, Township	....	....	....	....	....	....	....	3	3	....	390 00	390 00	....	209 84	208 76	
	Whitby, East, Township	....	....	....	....	....	....	....	1	2	....	360 00	360 00	....	204 80	229 04	
	Pickering	....	1	....		....	....	....	9	8	....	1065 00	1040 00	....	572 03	556 72	
	Port Perry	....	....	2	....	....	....	....	5	7	....	1130 00	1010 00	....	614 58	552 90	

SCHEDULE C—Comparative Statement by Municipalities, shewing the number of Provincial Licenses, etc.—*Continued.*

License District.	MUNICIPALITY.	Tavern.						Shop.			Wholesale.			Extended Tavern.			Extended Shop.			Six months.		
		Ordinary.			Beer and Wine.																	
		1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-91.
Ottawa	Ottawa City	75	80	88	*	*	*	68	56	59	2	1	2	1	....	....	....	4	....	1	1	....
North Oxford	East Nissouri	....	2	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Blandford	....	1	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	East Zorra	....	3	4	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Embro	....	2	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	West Zorra	....	1	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Woodstock	....	12	13	....	....	....	....	3	3	....	1	1	....	....	....	....	....	....	....	....	....
	Blenheim	....	7	8	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
South Oxford	Ingersoll	....	7	9	....	....	....	....	1	2	....	....	....	....	....	....	....	....	....	....	....	....
	Tilsonburg	....	4	4	....	....	....	....	2	2	....	....	....	....	....	1	....	....	....	....	....	....
	Norwich, Village	....	4	4	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	North Oxford	....	2	3	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	North Norwich	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	South Norwich	....	4	4	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Dereham	....	2	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	West Oxford	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	East Oxford	....	1	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....

* 1 Beer and Wine Vessel not included.

SCHEDULE C.—*Continued.*

License District.	MUNICIPALITY.	Licenses Transferred and Removed.						Total.			Amount received for Provincial Licences, Transfers, Removals, and Fines in each Municipality.			Proportion thereof paid to Municipalities.			REMARKS.
		Transfers.			Removals.												
		1888-9.	1889-90.	1890-91.	1888-9.	1889-90.	1890-91.	1888-9.	1889-90.	1890-91.	1888-9.	1889-90.	1890-91.	1888-9.	1889-90.	1890-91.	
											$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	
Ottawa... ...	Ottawa City	14	12	24	2	12	10	150	166	183	42017 50	43940 00	47081 50	15960 82	16645 38	17984 15	
North Oxford ..	East Nissouri..........	....	....	1	....	....	....	...	2	3	....	180 00	185 00	... ...	57 32	65 44	Can. Temp. Act in force in 1888-9.
	Blandford	....	....	2	....	....	....	...	1	3	....	135 00	150 00	....	73 66	72 36	
	East Zorra	...	....	....	....	....	....	....	3	4	....	270 00	360 00	....	85 96	125 64	
	Embro	....	1	....	...	....	....	...	3	2	....	325 00	515 00	... ...	139 70	244 92	
	West Zorra............	....	....	....	....	..	....	....	1	1	....	90 00	90 00	....	28 65	31 42	
	Woodstock	....	4	3	....	....	1	....	20	21	....	4630 00	4845 00	....	2554 60	2812 64	
	Blenheim...............	....	4	2	....	....	....	....	11	10	....	840 00	1010 00	....	374 00	479 36	
South Oxford ...	Ingersoll	....	2	3	....	....	.. ..	....	10	14	....	2220 00	3035 00	....	1245 25	1747 07	Can. Temp. Act in force in 1888-9.
	Tilsonburg	....	1	1	....	1	....	....	8	8	.. ..	1670 00	1692 50	....	935 98	978 23	
	Norwich, Village	....	....	....	...	....	....	...	4	4	....	720 00	720 00	....	337 80	348 46	
	North Oxford..........	....	1	....	....	....	....	...	3	3	....	265 00	390 00	....	130 94	201 35	
	North Norwich.........	....	....	....	....	....	....	..	....	...	.. ..	....	....	....	......	....	
	South Norwich	....	....	1	....	....	....	...	4	5	....	370 00	365 00	....	101 88	110 72	
	Dereham	.....	1	....	..	..	....	....	3	2	....	285 00	460 00	... .	91 70	334 24	
	West Oxford	....	....	....	....	....	....	...	....	....	....	50 00	....	....	20 37	....	
	East Oxford...........	....	....	....	....	....	....	....	1	1	....	90 00	90 00	....	24 46	27 12	

SCHEDULE J.—Comparative Statement by Municipalities, shewing the number of Provincial Licenses, etc.—*Continued.*

License District.	MUNICIPALITY.	Tavern.						Shop.			Wholesale.			Extended Tavern.			Extended Shop.			Six Months		
		Ordinary.			Beer and Wine.																	
		1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.
Parry Sound	Nipissing	2	2	2																		
	McKellar	1	1	1																		
	Armour	4	3																			
	Strong	3	3																			
	Chapman	2	2	2																		
	Parry Sound		1	1																		
	Foley																					
	Himsworth, North	2	2	2																		
	Perry	2	3	4																		
	Humphrey	1	2	2																1	1	1
	Machar		1	1																		
	Sundridge			3																		
	Burk's Falls			2																		
	Himsworth, South			3																		
	Hagerman			1																		
	Unorganized Territory	6	5	2		1																
Pee	Brampton	6	6	6	1	1	1	2	2	2												
	Chinguacousy	9	9	9	1																	
	Toronto, Township	13	13	13	1																	
	Toronto, Gore	4	3	3																		
	Streetsville	2	2	2				1	1	1								1				
	Caledon	10	9	10																		

SCHEDULE C.—*Continued.*

License District.	MUNICIPALITY.	Licenses Transferred and Removed.						Total.			Amounts received for Provincial Licenses, Transfers, Removals, and Fines in each Municipality.			Proportion thereof paid to Municipalities.			REMARKS.
		Transfers.			Removals.												
		1888-9.	1889-90.	1890-91.	1888-9.	1889-90.	1890-91.	1888-9.	1889-90.	1890-91.	1888-9.	1889-90.	1890-91.	1888-9.	1889-90.	1890-91.	
											$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	
Parry Sound....	Nipissing	....	....	....	....	....	....	2	2	2	180 00	180 00	180 00	56 13	53 26	51 28	
	McKellar	....	....	....	....	....	....	1	1	1	90 00	150 00	170 00	28 08	86 64	94 20	
	Armour	1	1	....	....	....	....	5	5	....	365 00	275 00	50 00	114 60	82 14	21 37	
	Strong	1	1	....	....	....	....	4	4	....	275 00	275 00	....	86 58	82 14	....	
	Chapman	....	....	....	....	....	....	2	2	2	180 00	180 00	180 00	56 12	53 28	51 30	
	Parry Sound	....	....	1	....	....	....	....	1	2	310 00	220 00	355 00	145 23	66 60	121 82	
	Foley	....	....	....	....	....	....	....	....	....	100 00	230 00	....	46 80	....	....	
	Himsworth, North	1	....	....	....	....	....	3	2	2	235 00	270 00	230 00	108 49	103 26	101 30	
	Perry	1	....	1	....	....	....	3	3	5	185 00	225 00	365 00	58 49	79 90	104 72	
	Humphrey	....	....	....	....	....	....	2	3	3	135 00	512 50	225 00	42 12	66 58	64 12	
	Machar	....	....	....	....	....	....	....	1	1	....	90 00	90 00	....	26 64	25 64	
	Sundridge	....	....	2	....	....	1	....	....	6	....	....	375 00	....	....	83 36	
	Burk's Falls	....	....	2	....	....	....	....	....	2	....	....	240 00	....	....	51 28	
	Himsworth, South	....	....	2	....	....	....	....	....	5	....	....	280 00	....	....	81 24	
	Hagerman	....	....	....	....	....	....	....	....	1	....	....	90 00	....	....	25 64	
	Unorganized Territory.	6	....	....	....	1	....	6	7	2	685 00	612 50	420 00	....	....	....	Payable to Province, less proportion of expenses.
Peel	Brampton	....	1	....	....	....	....	9	10	9	1482 50	1512 50	1502 50	580 10	593 62	566 68	
	Chinguacousy	2	....	1	....	....	....	12	9	10	857 50	810 00	815 00	302 90	280 36	270 00	
	Toronto, Township	2	3	3	....	....	....	16	17	16	1231 50	1320 50	1198 00	442 22	485 46	403 00	
	Toronto, Gore	4	1	....	....	....	....	8	4	3	380 00	295 00	270 00	135 78	106 44	90 00	
	Streetsville	....	....	1	....	....	....	4	3	4	520 00	470 00	445 00	231 83	179 42	160 08	
	Caledon	2	2	3	....	....	....	12	12	13	930 00	925 00	965 00	329 00	337 47	312 54	

SCHEDULE C.—Comparative Statement by Municipalities, shewing the number of Provincial Licenses, etc.—*Continued.*

License District.	MUNICIPALITY.	Tavern.						Shop.			Wholesale.			Extended Tavern.			Extended Shop.			Six Months.		
		Ordinary.			Beer and Wine.																	
		1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.
North Perth	Mornington	12	12	12	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Ellice	6	5	4	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Wallace	2	2	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Elma	4	4	4	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Listowel	7	8	8	....	....	....	1	1	1	....	....	....	....	....	....	....	....	....	....	....	....
	Stratford	20	20	20	1	1	1	4	4	4	....	....	....	1	....	....	....	....	....	....	....	....
	North Easthope	4	4	4	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Milverton	3	3	3	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
South Perth	South Easthope	6	6	6	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Fullarton	3	3	3	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Mitchell	6	6	6	....	....	....	1	1	1	....	....	....	....	....	....	....	....	....	....	....	....
	Hibbert	4	3	3	....	....	....	2	1	1	....	....	....	....	....	....	....	....	....	....	....	....
	Downie	5	5	5	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	St. Mary's	8	8	8	....	....	....	2	2	2	....	....	....	....	....	....	....	....	....	....	....	....
	Blanshard	3	3	2	....	....	....	....	....	....	....	....	....	....	....	1	....	....	....	....	....	....
	Logan	2	2	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....

SCHEDULE C.—*Continued.*

Lscense District.	MUNICIPATITY.	Licenses Transferred and Removed.						Total.			Amounts received for Provincial Licenses, Transfers, Removals and Fines in each Municipality.			Proportion thereof paid to Municipalities.			REMARKS.
		Transfers.			Removals.												
		1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	
											$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	
North Perth	Mornington	2	....	1	....	....	....	14	12	13	1244 00	1130 00	1085 00	471 41	427 24	409 66	
	Ellice	1	....	....	....	....	....	7	5	4	605 00	520 00	360 00	226 56	205 32	135 64	
	Wallace	....	1	1	....	....	....	2	3	3	180 00	185 00	185 00	63 99	69 36	70 62	
	Elma	1	....	....	....	....	....	5	4	4	375 00	410 00	360 00	135 96	160 92	135 62	
	Listowel	4	2	7	....	....	..	12	11	16	2040 00	2120 00	2215 00	1059 98	1116 10	1178 33	
	Stratford	4	3	3	1	....	1	31	28	29	6576 67	6455 00	6720 00	2898 73	2889 96	3065 22	
	North Easthope	....	....	....	....	....	....	4	4	4	380 00	360 00	360 00	138 66	133 16	135 62	
	Milverton	....	....	1	....	....	....	3	3	4	360 00	360 00	365 00	96 31	99 90	104 52	
South Perth	South Easthope	1	....	1	....	....	....	7	6	7	605 00	540 00	575 00	222 03	188 05	202 84	
	Fullarton	...	1	2	....	....		3	4	5	270 00	295 00	345 00	94 30	107 08	130 94	
	Mitchell	2	2	1	....	....	....	9	9	8	1655 00	1680 00	1650 00	859 38	872 38	851 10	
	Hibbert	....	1	....	....	....	....	6	5	4	550 00	365 00	380 00	193 32	127 98	133 50	
	Downie	...	....	2	....	....	....	5	5	7	415 00	460 00	460 00	146 26	161 94	159 18	
	St. Mary's	1	4	3	....	....	....	11	14	13	2205 00	2222 50	2215 00	1071 86	1081 88	1069 84	
	Blanshard	....	....	....	....	....	....	3	3	3	270 00	320 00	202 50	94 28	120 14	69 32	
	Logan	....	....	....	....	....	....	2	2	2	180 00	180 00	230 00	62 84	62 68	87 28	

SCHEDULE C.—Comparative Statement by Municipalities, shewing the number of Provincial Licenses, etc.—*Continued.*

License District.	MUNICIPALITY.	Tavern.						Shop.			Wholesale.			Extended Tavern.			Extended Shop.			Six Months.		
		Ordinary.			Beer and Wine.																	
		1888-9.	1889-90.	1890-91.	1888-9.	1889-90.	1890-91.	1888-9.	1889-90.	1890-91.	1888-9.	1889-90.	1890-91.	1888-9.	1889-90.	1890-91.	1888-9.	1889-90.	1890-91.	1888-9.	1889-90.	1890-91.
East Peterborough..	Ashburnham	....	2	2	....	1	1	....	2	2	....	....	....	....	....	....	....	....	....	....	....	....
	Asphodel	....	1	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Dummer	....	1	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Otonabee	....	2	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Burleigh, Anstruther and Chandos	....	3	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Norwood	....	3	3	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Belmont and Methuen	....	3	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Douro	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
West Peterborough..	Smith	....	3	3	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1	1
	Lakefield	....	3	3	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Peterborough	....	20	21	....	1*	....		8	9	....	....	....	....	....	....	....	....	....	....	....	....
	North Monaghan	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Ennismore	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....

SCHEDULE C.—*Continued.*

License District.	MUNICIPALITY.	Licenses Transferred and Removed.						Total.			Amounts received for Provincial Licenses, Transfers, Removals, and Fines in each Municipality.			Proportion thereof paid to Municipalities.			REMARKS.
		Transfers.			Removals.												
		1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	
											$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	
East Peterborough..	Ashburnham	....	1	2	....	....	....	....	6	7	....	1310 00	990 00	....	798 44	493 98	Can. Temp. Act in force in 1888-9.
	Asphodel	....	....	....	....	....	....	....	1	1	....	90 00	90 00	....	16 64	16 83	
	Dummer	....	....	....	....	....	....	....	1	1	....	90 00	90 00	....	16 64	16 82	
	Otonabee	....	....	....	....	....	....	....	2	2	....	180 00	180 00	....	33 28	33 66	
	Burleigh, Anstruther and Chandos	....	....	1	....	....	....	....	3	3	....	270 00	185 00	....	49 92	35 06	
	Norwood	....	....	....	....	....	....	....	3	3	....	780 00	780 00	....	469 92	470 50	
	Belmont and Methuen	....	2	....	....	....	....	....	5	2	....	700 00	420 00	....	472 70	273 66	
	Douro	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	
West Peterborough..	Smith	....	....	....	....	....	....	....	4	4	....	315 00	315 00	....	108 52	112 80	Can. Temp. Act in force in 1888-9.
	Lakefield	....	....	1	....	....	....	....	3	4	....	780 00	605 00	....	513 02	339 36	
	Peterborough	....	2	8	....	....	....	....	31	38	....	7682 50	8366 00	....	4429 19	4978 04	
	North Monaghan	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	
	Ennismore	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	

* Not including one beer and wine, vessel.

SCHEDULE C.—Comparative Statement by Municipalities, shewing the number of Provincial Licenses, etc.—*Continued.*

License District.	MUNICIPALITY.	Tavern.						Shop.			Wholesale.			Extended Tavern.			Extended Shop.			Six Months.		
		Ordinary.			Beer and Wine.																	
		1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.
Prescott	South Plantagenet	8	7	6																		
	East Hawkesbury	6	4	6											2							
	Longueuil	2	2	1																		
	North Plantagenet	13	12	12																		
	Caledonia	2	2	2																2	1	2
	Alfred	3	5	5																		
	West Hawkesbury	4	4	5				1	1	2												
	Hawkesbury, Village	3	3	3																		
	L'Orignal	3	3	3																		
Prince Edward	Picton	4*	5*	6				2	2	2										1		
	South Marysburgh	1	1	1																		
	Wellington	2	2	2																		
	Sophiasburgh	2	2	1	2	1	1															
	Hillier	3	2	2																		
	Ameliasburgh	4	3	4			1													1	1	1
	Hallowell																					
	North Marysburgh																					
Rainy River	Rat Portage	8	8	8				2	2	2	1	1 Ext										
	Keewatin		2	2					1	1												
	Unorganized Districts	3	2	1				1														
North Renfrew	Bromley	2	2	2																		
	Pembroke	9	10	10				2	3	3												
	Ross	3	3	3				1	1	1												
	Westmeath	4	4	4																		
	Wilberforce	2	2	2																		
	Head, Maria and Clara	2	1	2					1	1												
	Petawawa		1	1																		
	Rolph, Buch'an & Wylie																					

SCHEDULE C.—*Continued.*

License District.	Municipality.	Licenses Transferred and Removed.						Total.			Amount received for Provincial Licenses, Transfers, Removals, and Fines in each Municipality.			Proportion thereof paid to Municipalities.			Remarks.
		Transfers.			Removals.												
		1888-9.	1889-90.	1890-91.	1888-9.	1889-90.	1890-91.	1888-9.	1889-90.	1890-91.	1888-9. $ c.	1889-90. $ c.	1890-91. $ c.	1888-9. $ c.	1889-90. $ c.	1890-91. $ c.	
Prescott	South Plantagenet	4	2	1	1			13	9	7	765 00	690 00	545 00	289 42	252 04	191 76	
	East Hawkesbury	1						7	6	6	605 00	612 50	600 00	261 22	325 54	249 12	
	Longueuil							2	2	1	180 00	180 00	110 00	66 18	63 00	42 04	
	North Plantagenet	1	2					14	14	12	1260 00	1193 00	1100 00	479 64	437 40	388 78	
	Caledonia			1				4	3	5	270 00	265 00	275 00	99 24	99 76	97 20	
	Alfred		1	1				3	6	6	320 00	475 00	455 00	126 78	170 64	160 24	
	West Hawkesbury			3				5	5	10	650 00	660 00	925 00	365 40	362 78	508 53	
	Hawkesbury, Village	1	2	2				4	5	5	365 00	390 00	370 00	101 98	110 26	99 82	
	L'Orignal		1					3	4	3	450 00	395 00	390 00	189 24	127 14	124 56	
Prince Edward	Picton	1	3	3				9	10	11	2047 50	2355 00	2275 00	1081 46	1076 99	1229 46	
	South Marysburgh							1	1	1	110 00	110 00	110 00	41 30	41 06	41 42	
	Wellington							2	2	2	350 00	350 00	380 00	152 59	152 12	163 54	
	Sophiasburgh							4	3	2	165 00	275 50	127 50	42 60	66 72	32 12	
	Hillier							3	2	2	180 00	180 00	180 00	42 59	42 13	42 84	
	Ameliasburgh	1		4				6	4	10	410 00	385 00	462 50	97 60	98 30	114 18	
	Hallowel																
	North Marysburgh											50 00			17 56		
Rainy River	Rat Portage	1	2	1	1			12	13	11	2445 00	2072 50	3005 00	1542 93	1366 84	1969 70	
	Keewatin		1						4	3		605 00	600 00		406 24	395 35	
	Unorganized Districts							4	2	1	360 00	180 00	140 00				Payable wholly to the Province, less expenses.
North Renfrew	Bromley							2	2	2	280 00	240 00	240 00	105 48	115 04	117 98	
	Pembroke			1				11	13	14	1815 00	2600 00	2665 00	586 94	1127 00	1183 99	
	Ross		1					4	5	4	720 00	565 00	630 00	475 06	312 38	349 82	
	Westmeath							4	4	4	390 00	470 00	400 00	129 44	214 65	155 98	
	Wilberforce							2	2	2	180 00	180 00	200 00	57 52	55 04	67 65	
	Head, Maria and Clara							2	2	3	180 00	180 00	320 00	57 54	55 03	111 16	
	Petawawa								1	1	50 00	90 00	90 00	19 28	27 52	29 00	
	Rolph, Buch'an & Wylie										50 00			19 30			

*Two Vessel Licenses for Great Lakes, issued at Picton.

SCHEDULE C.—Comparative Statement by Municipalities, shewing the number of Provincial licenses, etc.—*Continued.*

License District.	MUNICIPALITY.	Tavern.						Shop.			Wholesale.			Extended Tavern.			Extended Shop.			Six Months.		
		Ordinary.			Beer and Wine.																	
		1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.
South Renfrew	McNab	1	4	5		1																
	Renfrew	6	6	6				2	3	3												
	Grattan	4	4	5				2	3	3												
	Brougham	2	1	1				1	1													
	Brudenell and Lyndoch	4	3	2				1	1	1												
	Arnprior	7	7	7				2	2	3												
	Radcliffe and Raglan	2																				
	Griffith & Matawatchan																					
	Bagot and Blithfield	4	4	4					1	1						1						
	Admaston	1	1	1																		
	Jones	1																				
	Hagarty	1	1	1				1														
	Sebastopol																					
	Horton																					
Russell	Cambridge	11	7	7																		
	Russell	6	7	8																		
	Clarence	6	7	7																		
	Gloucester		11	11																		
	Cumberland	7	7	7																		
	Osgoode		7	7																		
	Rockland	2	2	2																		
	Casselman		4	4																		
St. Catharines, City		22	23	23	4	3	3	7	6	5								1		1	1	1
Centre Simcoe	Barrie	11	11	10				3	3	1												
	Sunnidale	3	3	3																	1	1
	Vespra	2	2	3																	1	
	Floss	4	4	4	1			1	1	1												
	Young	2																				
	Tiny		2	2						1												

SCHEDULE C.—*Continued.*

License District.	Municipality.	Licenses Transferred and Removed.						Total.			Amounts received for Provincial Licenses, Transfers Removals, and Fines in each Municipality.			Proportion thereof paid to Municipalities.			Remarks.
		Transfers.			Removals.												
		1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890 1.	1888-9.	1889-90.	1890-1.	
											$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	
South Renfrew	McNab	....	1	2	....	....	....	1	6	7	140 00	492 50	510 00	46 60	200 14	196 02	
	Renfrew	2	1	1	....	....	....	10	10	10	1260 00	1425 00	1359 00	399 66	563 16	528 60	
	Grattan	1	2	....	....	....	....	7	9	8	545 00	665 00	1130 00	168 00	196 88	419 22	
	Brougham...........	....	....	....	....	....	....	3	2	1	270 00	310 00	90 00	84 00	107 57	28 26	
	Brudenell and Lyndoch.	....	1	....	....	....	....	5	5	3	450 00	365 00	270 00	140 00	97 45	84 80	
	Arnprior	1	1	3	....	1	2	10	11	15	1615 00	1920 00	2245 00	510 91	1101 08	1198 02	
	Radcliffe and Raglan ..	....	....	....	....	....	....	2	....	....	180 00	....	....	56 00	....	....	
	Griffith & Matawatchan	....	....	....	....	....	....	....	....	....	50 00	50 00	....	23 32	23 84	....	
	Bagot and Blithfield...	2	2	....	....	....	....	6	7	6	460 00	570 00	527 50	144 06	200 20	177 80	
	Admaston..........	....	....	....	....	....	....	1	1	1	90 00	100 00	100 00	28 00	34 74	38 26	
	Jones	....	....	....	....	....	....	1	....	....	90 00	....	....	28 00	....	....	
	Hagarty	....	....	....	....	....	....	2	1	1	180 00	90 00	140 00	56 00	16 91	51 82	
	Sebastopol	....	....	....	....	....	....	....	....	....	....	....	50 00	....	....	23 56	
	Horton..........	....	....	....	....	....	....	....	....	....	....	....	50 00	....	....	23 56	
Russell.....	Cambridge	3	3	1	....	....	1	14	10	9	1025 00	645 00	700 00	361 93	226 88	255 34	
	Russell....	....	1	3	....	....	....	6	8	11	540 00	635 00	755 00	187 47	221 66	268 37	
	Clarence	1	....	5	....	....	....	7	7	12	597 00	630 00	659 00	217 18	219 06	233 98	
	Gloucester	....	2	3	....	....	....	....	13	14	....	1000 00	1135 00	....	349 44	419 50	
	Cumberland..........		1	1	....	....	....	7	8	8	870 00	775 00	665 00	410 80	361 65	237 10	
	Osgoode.	....	....	1	....	....	....	....	7	8	....	815 00	970 00	....	399 26	479 84	
	Rockland	....	....	....	....	....	....	2	2	2	240 00	240 00	410 00	62 50	62 58	199 02	
	Casselman...........	....	....	2	....	....	....	....	4	6	....	480 00	490 00	....	125 18	130 28	
St. Catharines, City	....	2	2	6	....	1	1	36	37	39	6862 50	6761 25	6492 50	2287 71	2194 71	2073 64	
Centre Simcoe ...	Barrie.....	3	7	2	....	....	....	17	21	13	3195 00	3565 00	2990 00	1551 44	1856 94	1580 73	
	Sunnidale............	1	....	....	....	....	....	4	4	4	455 00	455 00	420 00	259 62	224 00	183 21	
	Vespra....	....	....	....	....	....	....	2	3	3	330 00	225 00	270 00	201 61	60 00	67 69	
	Floss...............	3	....	....	....	....	....	9	5	5	510 00	500 00	550 00	134 16	124 51	128 68	
	Young	....	....	....	....	....	....	2	....	....	180 00	....	....	66 02	....	....	
	Tiny	....	1	....	....	....	....	....	3	3	....	185 00	270 00	....	50 00	68 23	

SCHEDULE C.—Comparative Statement by Municipalities, shewing the number of Provincial Licenses, etc.—*Continued.*

License District.	MUNICIPALITY.	Tavern.						Shop.			Wholesale.			Extended Tavern.			Extended Shop.			Six months.		
		Ordinary.			Beer and Wine.																	
		1888-9.	1889-90.	1890-91.	1888-9.	1889-90.	1890-91.	1888-9.	1889-90.	1890-91.	1888-9.	1889-90.	1890-91.	1888-9.	1889-90.	1890-91.	1888-9.	1889-90.	1890-91.	1888-9.	1889-90.	1890-91.
East Simcoe......	Orillia and Matchedash.	2	2	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Oro	3	3	3	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Tay	2	2	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Medonte	8	8	9	....	....	....	1	1	2	....	....	....	....	....	....	....	....	....	....	....	....
	Penetanguishene	4	4	4	....	....	....	1	1	1	....	....	....	....	....	....	....	....	....	....	1	1
	Orillia, Town	8	8	8	....	....	....	1	1	1	....	....	....	....	....	....	....	....	....	....	....	....
	Midland	5	5	5	....	....	....	1	2	2	....	....	....	....	....	....	....	....	....	....	....	....
West Simcoe......	Essa	7	8	7	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Nottawasaga	9	9	6	....	....	....	1	1	....	....	....	....	....	....	....	....	....	....	....	....	....
	Stayner	4	4	5	....	....	....	2	1	....	....	....	....	....	....	....	....	....	....	....	....	....
	Collingwood, Town	8	9	9	....	....	....	2	3	3	....	....	....	....	....	....	....	....	....	....	....	....
	Tossorontio	3	4	3	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Alliston	5	5	6	....	....	....	2	2	2	....	....	....	....	1	....	....	....	....	....	....	....
	Creemore	....	....	3	....	....	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....
Stormont....	Osnabruck	11	11	13	....	....	....	1	1	....	....	....	....	....	....	....	....	....	....	....	....	....
	Finch	7	6	6	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Roxborough	9	9	7	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Thunder Bay......	Neebing	11	8	11	....	....	....	3	3	3	....	....	....	....	....	2	....	....	....	....	....	1
	Port Arthur	18	15	14	....	....	....	4	4	3	....	....	....	....	....	2	....	....	....	....	1	1
	Unorganized Territory.	8	10	9	....	....	1	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....

SCHEDULE C—*Continued.*

License District.	MUNICIPALITY.	Licenses Transferred and Removed.						Total.			Amount received for Provincial Licenses, Transfers, Removals, and Fines in each Municipality.			Proportion thereof paid to Municipalities.			REMARKS.
		Transfers.			Removals.												
		1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	
											$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	
East Simcoe.....	Orillia and Matchedash.	1	....	....	....	....	....	3	2	2	285 00	280 00	180 00	114 96	108 50	59 34	
	Oro..................	1	1	4	....	....	....	4	4	7	420 00	295 00	1290 00	168 59	101 10	98 88	
	Tay.....	....	....	....	....	1	....	2	3	1	230 00	325 00	130 00	86 84	191 51	69 66	
	Medonte..........	1	1	3	1	....	..	11	10	14	1000 00	885 00	1120 47	372 96	303 31	390 84	
	Penetanguishene.......	....	....	....	....	....	....	5	6	6	1350 00	1485 00	1505 00	804 35	876 99	887 45	
	Orillia, Town	3	1	3	....	...	....	12	10	12	2395 00	2575 00	2455 00	1234 32	1506 60	1448 36	
	Midland..............	1	2	1	....	....	1	7	9	9	1116 70	1500 00	1450 00	577 34	836 74	671 84	
West Simcoe.....	Essa	3	2	3	....	...	....	10	10	10	655 00	1030 00	855 00	231 69	531 42	438 90	
	Nottawasaga..........	1	3	1	....	....	....	11	13	7	955 00	1115 00	715 00	341 01	525 88	338 38	
	Stayner.............	....	....	..	....	....	....	6	5	5	770 00	750 00	750 00	213 46	211 91	210 50	
	Collingwood, Town..	....	....	1	....	....	....	10	12	13	1620 00	3290 00	3245 00	478 98	1975 16	1947 80	
	Tossorontio...........	1	1	1	....	....	....	4	5	4	292 75	365 00	335 00	105 54	129 81	157 34	
	Alliston..............	2	1	....	....	....	....	9	9	8	850 00	1347 75	1350 00	223 86	602 45	590 47	
	Creemore.............	....	....	2	....		....	....	....	6	....	....	530 00	....	....	171 56	
Stormont....	Osnabruck	4	1	2	....	....	....	16	13	15	1100 00	1325 00	1310 00	315 53	534 16	418 30	
	Finch..	1	2	....	....	....	....	8	8	6	635 00	610 00	600 00	181 21	210 10	191 39	
	Roxborough.......	1	1	3	1	....	1	11	10	11	840 00	1595 00	1230 00	243 04	965 47	737 87	
Thunder Bay......	Neebing..............	2	2	3	....	1	1	16	14	21	2890 00	2385 00	3090 00	2043 26	1686 61	2160 33	
	Port Arthur..........	1	..	1	....	....	....	24	19	21	6250 00	5220 00	4965 00	3684 96	3104 42	2978 46	
	Unorganized Territory.	1	....	..	....	....	....	10	10	10	1010 50	900 00	887 50	....	... .	......	Payable wholly to the Province less expenses.

SCHEDULE C.—Comparative Statement by Municipalities shewing the number of Provincial Licenses, etc.—*Continued.*

License District.	MUNICIPALITY.	Tavern.						Shop.			Wholesale.			Extended Tavern.			Extended Shop.			Six Months.		
		Ordinary.			Beer and Wine.																	
		1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.
Toronto	Toronto, City	150†	152*	150	....	....	....	50	50	50	12	14	11	14 & 1 B. & W.	2	2	4	6	1	1	1	1
East Victoria	Omemee	....	3	3	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Fenelon Falls	....	3	3	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Fenelon, Township	....	4	4	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1	1
	Bobcaygeon	....	3	3	....	....	....	....	....	....	....	....	....	....	....	1	....	....	....	....	....	....
	Somerville	....	3	4	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Bexley	....	2	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
West Victoria	Lindsay	....	14	11	....	....	....	....	2	2	....	....	....	....	....	3	....	....	....	....	....	....
	Woodville	....	3	3	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Digby	....	1	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Eldon	....	6	6	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Mariposa	....	4	4	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....

SCHEDULE C.—*Continued.*

License District.	MUNICIPALITY.	Licenses Transferred and Removed.						Total.			Amount received for Provincial Licenses, Transfers, Removals, and Fines in each Municipality.			Proportion thereof paid to Municipalities.			REMARKS.
		Transfers.			Removals.												
		1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	
											$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	
Toronto......	Toronto, City.........	27	34	39	11	15	6	270†	277	260	77217 50	78230 00	75442 50	32772 98	33436 98	31569 56	
East Victoria..	Omemee..............	....	....	2	....	1	....	....	4	5	....	580 00	612 50	....	289 32	305 64	Can. Temp. Act in force in 1888-9.
	Fenelon Falls..........	....	....	....	....	....	....	....	3	3	....	640 00	665 00	....	341 22	354 13	
	Fenelon, Township	....	3	3	....	....	....	....	8	8	....	490 00	420 00	....	163 34	132 76	
	Bobcaygeon..........	....	1	1	....	1	....	....	5	5	....	580 00	717 50	....	297 41	346 24	
	Somerville..........	....	1	....	....	1	....	....	5	4	....	330 00	424 00	....	126 62	162 98	
	Bexley...............	....	1	....	....	....	....	....	3	2	....	185 00	180 00	....	57 50	55 90	
West Victoria..	Lindsay..............	....	5	....	....	1	1	....	22	17	....	4500 00	3827 50	....	2535 74	2170 32	Can. Temp. Act in force in 1888-9.
	Woodville...........	....	1	1	....	....	....	....	4	4	....	387 00	365 00	....	87 30	79 02	
	Digby...............	....	....	....	....	....	....	....	1	1	....	90 00	90 00	....	25 32	25 62	
	Eldon...............	....	2	....	....	....	....	....	8	6	....	758 00	700 00	....	243 76	261 53	
	Mariposa............	....	....	2	....	....	....	....	4	6	....	500 00	520 00	....	241 22	251 06	

* Not including 1 Vessel License.

† Not including 2 Ordinary and 1 Beer and Wine Vessel License.

SCHEDULE C—Comparative Statement by Municipalities, shewing the number of Provincial Licenses, etc.—*Continued.*

License District.	MUNICIPALITY.	Tavern. Ordinary. 1888-9.	Tavern. Ordinary. 1889-90.	Tavern. Ordinary. 1890-1.	Tavern. Beer and Wine. 1888-9.	Tavern. Beer and Wine. 1889-90.	Tavern. Beer and Wine. 1890-1.	Shop. 1888-9.	Shop. 1889-90.	Shop. 1890-1.	Wholesale. 1888-9.	Wholesale. 1889-90.	Wholesale. 1890-1.	Extended Tavern. 1888-9.	Extended Tavern. 1889-90.	Extended Tavern. 1890-1.	Extended Shop. 1888-9.	Extended Shop. 1889-90.	Extended Shop. 1890-1.	Six months. 1888-9.	Six months. 1889-90.	Six months. 1890-91.
N. Waterloo.	Waterloo, Tp., N. part.	7	7	7	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Woolwich	6	6	6	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Wellesley	14	14	14	....	....	....	1	1	1	....	....	....	....	....	....	....	....	....	....	....	....
	Berlin	9	9	9	....	....	....	2	2	2	1	1	1	....	....	....	....	....	....	....	....	....
	Waterloo, Town	7	7	7	....	....	....	1	1	1	....	....	....	....	....	....	....	....	....	....	....	....
	Elmira	4	4	4	....	....	....	1	1	1	....	....	....	....	....	....	....	....	....	....	....	....
S. Waterloo.	Galt	8	9	9	....	....	....	2	2	2	....	....	....	....	....	....	....	....	....	....	....	....
	Preston	5	5	6	....	....	....	....	1	1	....	....	....	....	....	....	....	....	....	....	....	....
	Wilmot	14	14	14	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Waterloo, Tp., S. part.	5	5	5	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Hespeler	3	3	3	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	North Dumfries	2	2	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	New Hamburg	4	4	4	....	....	....	2	2	2	....	....	....	....	....	....	....	....	....	....	....	....
	Ayr, Village	2	2	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....

SCHEDULE C.—*Continued.*

License District.	MUNICIPALITY.	Licenses Transferred and Removed.						Total.			Amounts received for Provincial Licenses, Transfers, Removals, and Fines in each Municipality.			Proportion thereof paid to Municipalities.			REMARKS.
		Transfers.			Removals.												
		1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	
											$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	
N. Waterloo.	Waterloo, Tp., N. part.	1	....	1	....	....	....	8	7	8	635 00	702 00	655 00	238 27	274 26	242 24	
	Woolwich	2	2	1	....	....	....	8	8	7	579 00	570 00	730 00	223 69	217 42	299 42	
	Wellesley	1	1	3	....	....	....	16	16	18	1497 00	1483 00	1365 00	586 90	575 88	498 10	
	Berlin	1	....	....	....	....	....	13	12	12	2541 00	2482 00	2600 00	1178 42	1142 05	1137 92	
	Waterloo, Town	1	....	....	....	....	....	9	8	8	1517 00	1386 00	1345 00	598 02	522 44	491 11	
	Elmira	....	1	....	....	....	....	5	6	5	640 00	645 00	600 00	190 61	192 32	163 31	
S. Waterloo.	Galt	....	....	....	....	....	....	10	11	11	2700 00	2970 00	2970 00	1628 02	1790 62	1788 76	
	Preston	....	....	....	....	....	....	5	6	7	700 00	840 00	1000 00	260 50	312 52	374 38	
	Wilmot	....	....	1	....	....	....	14	14	15	1300 00	1260 00	1265 00	471 82	449 22	450 12	
	Waterloo, Tp., S. part.	....	....	....	....	....	....	5	5	5	450 00	450 00	490 00	160 52	160 44	181 12	
	Hespeler	....	....	....	....	....	....	3	3	3	360 00	376 00	385 00	96 30	104 82	109 20	
	North Dumfries		....	....	....	....	....	2	2	2	220 00	220 00	220 00	103 18	104 18	103 92	
	New Hamburg	....	....	....	....	....	....	6	6	6	940 00	840 00	840 00	366 10	312 52	311 76	
	Ayr, Village	....	....	....	....	....	....	2	2	2	350 00	360 00	350 00	174 18	179 52	173 92	

SCHEDULE C.—Comparative Statement by Municipalities, shewing the number of Provincial Licenses, etc —*Continued.*

License District.	MUNICIPALITY.	Tavern.						Shop.			Wholesale.			Extended Tavern.			Extended Shop.			Six Months.		
		Ordinary.			Beer and Wine.																	
		1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.
Welland ...	Niagara Falls, Town	12	14	15	....	....	....	3	3	3	....	....	....	1	....	....	....	....	....	1	2	1
	Crowland	2	2	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Chippewa	1	1	1	1	1	1	1	1	1	....	....	....	....	....	....	....	....	....	1	1 B&W	1 B&W
	Fort Erie	3	3	3	....	....	....	1	1	1	....	....	....	....	....	....	....	....	....	1	1	1
	Port Colborne	5	5	5	....	....	....	1	1	1	....	....	....	....	....	....	....	....	....	1	1	1
	Humberstone	8	8	8	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1	2	1
	Stamford	4	4	4	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1	....
	Thorold, Township	3	3	3	1	1	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Thorold, Town	4	4	4	....	....	....	1	1	1	....	....	....	1	....	....	....	....	....	1	....	....
	Welland	7	7	7	....	....	....	1	2	2	....	....	....	....	....	....	....	....	....	....	....	....
	Willoughby	3	2	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1	1
	Bertie	11	11	11	....	....	....	....	....	....	....	....	....	2	....	....	1	....	....	....	1	1
	Niagara Falls South, Vil	3	4	3	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
East Wellington.	Mount Forest	....	7	7	....	....	....	....	2	2	....	....	....	....	....	....	....	....	....	....	....	....
	Elora	....	4	4	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Nichol	....	4	4	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Fergus	....	5	5	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	West Garafraxa	....	1	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Erin, Township	....	4	4	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Arthur, Township	....	1	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	West Luther	....	1	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Erin, Village	....	2	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....

SCHEDULE C.—*Continued.*

License District.	MUNICIPALITY.	Licenses Transferred and Removed.						Total.			Amount received for Provincial Licences, Transfers, Removals, and Fines in each Municipality.			Proportion thereof paid to Municipalities.			REMARKS.
		Transfers.			Removals.												
		1888-9.	1889-90.	1890-91.	1888-9.	1889-90.	1890-91.	1888-9.	1889-90.	1890-91.	1888-9.	1889-90.	1890-91.	1888-9.	1889-90.	1890-91.	
											$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	
Welland	Niagara Falls, Town	2	8	6	....	....	....	19	27	25	2372 50	2804 00	2805 00	705 76	869 00	840 43	
	Crowland	2	....	....	....	....	....	4	2	2	210 00	180 00	180 00	83 34	67 54	66 78	
	Chippewa	1	....	....	1	....	....	6	4	4	575 00	547 50	507 50	316 70	315 38	291 84	
	Fort Erie	1	....	....	1	....	....	7	5	5	550 00	540 00	605 00	155 60	151 96	186 46	
	Port Colborne	1	....	....	....	....	....	8	7	7	882 50	897 50	899 50	317 02	328 26	326 80	
	Humberstone	....	....	3	....	....	....	9	10	12	825 00	830 00	857 00	316 76	315 18	335 06	
	Stamford	....	3	....	....	....	....	4	8	4	360 00	420 00	360 00	133 39	160 42	133 56	
	Thorold, Township	....	....	1	....	....	....	4	4	5	327 50	307 50	317 50	127 80	118 20	122 44	
	Thorold, Town	....	2	1	....	....	1	7	7	7	1552 50	1360 00	1382 00	945 56	830 74	840 43	
	Welland	4	1	2	....	....	....	12	10	11	1470 00	1580 00	1607 00	594 48	633 06	643 54	
	Willoughby	1	....	....	....	....	....	4	3	3	275 00	235 00	225 00	102 78	90 06	83 48	
	Bertie	4	3	4	1	....	....	19	15	16	1581 00	1452 50	1534 35	865 12	799 28	840 44	
	Niagara Falls South, Vil	....	....	....	....	....	....	3	4	3	385 00	380 00	360 00	113 92	112 56	100 17	
East Wellington.	Mount Forest	....	1	....	....	....	....	....	10	9	....	1945 00	1940 00	....	914 38	916 03	Can. Temp. Act in force in 1888-9.
	Elora	....	....	....	....	....	....	....	4	4	....	640 00	640 00	....	267 36	268 68	
	Nichol	....	1	1	....	....	....	....	5	5	....	365 00	385 00	....	109 62	119 98	
	Fergus	....	....	1	....	....	....	....	5	6	....	1000 00	1045 00	....	534 23	556 20	
	West Garafraxa	....	1	....	....	....	....	....	2	2	....	155 00	320 00	....	89 08	183 38	
	Erin, Township	....	2	....	....	....	....	....	6	4	....	420 00	360 00	....	134 22	108 66	
	Arthur, Township	....	....	....	....	....	....	....	1	1	....	90 00	90 00	....	26 84	27 16	
	West Luther	....	....	....	....	....	....	....	1	1	....	90 00	90 00	....	26 84	27 18	
	Erin, Village	....	....	....	....	....	....	....	2	2	....	330 00	280 00	....	116 06	94 34	

SCHEDULE C.—Comparative Statement by Municipalities, shewing the number of Provincial Licenses, etc.—*Continued.*

License District.	MUNICIPALITY.	Tavern.						Shop.			Wholesale.			Extended Tavern.			Extended Shop.			Six Months.		
		Ordinary.			Beer and Wine.																	
		1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.
South Wellington	Pilkington	....	2	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Eramosa	....	7	7	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Guelph Township	....	1	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Puslinch	....	5	5	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Guelph City	....	16	16	....	....	....	....	2	2	....	....	....	....	....	....	....	....	....	....	....	....
West Wellington	Clifford	....	3	3	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Arthur Village	....	5	5	....	....	....	....	2	2	....	....	....	....	....	....	....	....	....	....	....	....
	Harriston	....	5	5	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Drayton	....	4	3	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Palmerston	....	6	6	....	....	....	....	1	....	....	....	....	....	....	1	....	....	....	....	....	....
	Maryborough	....	4	3	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Minto	....	1	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Peel	....	6	6	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
North Wentworth	Dundas	5	6	6	1	1	1	2	2	2	....	....	....	1	....	....	....	....	....	....	....	....
	Beverly	6	6	6	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	West Flamborough	8	7	7	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	East Flamborough	4	5	4	1	1	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Waterdown	2	2	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....

SCHEDULE C.—*Continued*

License District.	MUNICIPALITY.	Licenses Transferred and Removed.						Total.			Amounts received for Provincial Licenses, Transfers, Removals, and Fines in each Municipality.			Proportion thereof paid to Municipalities.			REMARKS.
		Transfers.			Removals.												
		1888-9.	1889-90.	1890-91.	1888-9.	1889-90.	1890-91.	1888-9.	1889-90.	1890-91.	1888-9.	1889-90.	1890-91.	1888-9.	1889-90.	1890-91.	
											$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	
South Wellington	Pilkington								2	2		180 00	218 00		57 28	73 64	Can. Temp. Act in force in 1888-9.
	Eramosa		1						8	7		635 00	700 00		202 88	265 75	
	Guelph Township		1	1					2	2		95 00	147 00		31 02	54 53	
	Puslinch		2						7	5		530 00	560 00		181 40	191 10	
	Guelph City		4	7					22	25		5510 00	5095 00		2711 80	2283 23	
West Wellington	Clifford		1	3					4	6		365 00	375 00		82 22	84 38	Can. Temp Act in force in 1888-9.
	Arthur Village		2	3					9	10		1350 00	1435 00		663 58	709 02	
	Harriston		1						6	5		1375 00	1370 00		774 57	799 59	
	Drayton								4	3		805 00	640 00		426 12	338 71	
	Palmerston		1	1					8	8		1285 00	1275 00		478 89	541 85	
	Maryborough		1						5	3		765 00	354 00		506 68	163 95	
	Minto								1	1		90 00	90 00		26 66	25 90	
	Peel		5	1					11	7		735 00	749 00		324 78	354 54	
North Wentworth	Dundas		1	3				9	10	12	1545 00	1647 50	1672 50	655 16	679 68	703 16	
	Beverly	2		1				8	6	7	642 00	540 00	545 00	217 71	162 08	170 40	
	West Flamborough		2	2				8	9	9	964 00	836 00	836 00	459 61	389 64	396 76	
	East Flamborough	2	1	1				7	7	6	607 50	752 50	727 50	331 94	399 84	440 08	
	Waterdown							2	2	2	320 00	320 00	300 00	136 54	134 04	116 04	

SCHEDULE C.—Comparative Statement by Municipalities, shewing the number of Provincial Licenses, etc.—*Continued.*

License District.	MUNICIPALITY.	Tavern.						Shop.			Wholesale.			Extended Tavern.			Extended Shop.			Six Months.		
		Ordinary.			Beer and Wine.																	
		1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-91.	1888-9.	1889-90.	1890-1.
South Wentworth	Binbrook	1	1	1																		
	Ancaster	4	4	4				2	1	2				2								
	Saltfleet	6	7	7										1								1 B W.
	Barton	7	8	8																		
	Glanford	2	1	2																		
East York	Scarborough	7	5	5																		
	Markham, Township	8	7	7											1						1	1 B W.
	York, East of Yonge St.	9	10	9																		
	Markham, Village	3	3	3																		
	Richmond Hill	2	2	2																		
	East Toronto	1	3	3				1														
North York	Aurora	3	3	3																		
	Holland Landing	2	2	2																		
	North Gwillimbury	4	3	3		1	1															
	King	10	10	10																		
	East Gwillimbury	5	5	5		1	1									1						
	Whitchurch	3	3	3	1	1	1															
	Newmarket	6	6	6				1	1	2												
	Georgina	5	6	5	1	1	2															
	Stouffville	3	3	3																		

SCHEDULE C.—*Continued.*

License District.	MUNICIPALITY.	Licenses Transferred and Removed.						Total.			Amount received for Provincial Licenses, Transfers, Removals, and Fines in each Municipality.			Proportion thereof paid to Municipality.			REMARKS.
		Transfers.			Removals.												
		1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1889-90.	1888-9.	1889-90.	1890-1.	
											$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	
South Wentworth....	Binbrook	1	1	1				4	2	2	190 00	95 00	95 00	56 60	27 69	26 50	
	Ancaster	1	2	1				7	7	8	615 00	580 00	593 00	135 94	188 92	166 76	
	Saltfleet	2	3		1			10	10	7	747 00	645 00	740 00	298 52	185 32	215 96	
	Barton	2	1				1	9	9	9	660 00	765 00	745 00	165 60	223 66	205 78	
	Glanford				1			3	1	2	185 00	90 00	180 00	48 79	25 56	48 90	
East York..	Scarborough	1	1					8	8	6	1055 00	877 50	868 75	672 37	511 06	489 34	
	Markham, Township	3	2	1				11	9	8	1055 00	960 00	1085 00	539 90	496 75	526 26	
	York, East of Yonge St.	1		1				10	10	10	995 00	1100 00	1085 00	433 11	476 70	442 82	
	Markham Village		1					3	4	3	420 00	485 00	420 00	143 38	172 99	134 50	
	Richmond Hill							2	2	2	420 00	420 00	420 00	235 72	235 32	229 68	
	East Toronto	1		1				3	3	4	455 00	450 00	475 00	268 03	173 00	174 84	
North York.	Aurora							3	3	3	525 00	545 00	590 00	195 98	210 96	231 73	
	Holland Landing							2	2	2	240 00	240 00	240 00	60 46	62 74	61 66	
	North Gwillimbury	1	3	2				5	7	6	405 00	422 50	317 50	143 64	169 96	113 04	
	King		1	1				10	11	12	1520 00	1345 00	1427 50	813 38	737 30	774 83	
	East Gwillimbury	1	3	1				6	9	7	455 00	522 50	492 50	153 75	190 88	172 14	
	Whitchurch	1	1	2				5	5	6	312 50	312 50	367 50	108 34	112 44	138 74	
	Newmarket	1	2	1				8	9	9	1285 00	1235 00	1520 00	477 54	463 54	614 84	
	Georgina	1						7	7	7	612 50	577 50	545 00	229 34	203 94	195 28	
	Stouffville	1	1					4	4	3	455 00	455 00	450 00	183 27	186 74	182 50	

SCHEDULE C.—Comparative Statement, by Municipalities, shewing the number of Provincial Licenses, etc.—*Continued.*

License District.	MUNICIPALITY.	Tavern.						Shop.			Wholesale.			Extended Tavern.			Extended Shop.			Six Months.		
		Ordinary			Beer and Wine.																	
		1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.
West York..	York, West of Yonge St.	10	9	7	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Vaughan	9	10	9	....	....	....	....	....	....	....	....	....	....	....	1	....	....	....	....	....	....
	Etobicoke	4	5	5	....	....	....	....	....	....	....	....	....	1	....	....	....	....	....	....	....	....
	Parkdale	2	...	....	....	....	....	....	....	....	....	....	....	....	....	....	1	....	....	....	....	....
	Woodbridge, Village	3	3	3	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Weston, Village	3	3	3	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	West Toronto Junction.	3	7	4	....	....	....	....	....	....	....	....	....	....	....	3	....	....	....	....	....	....
	North Toronto Village.	....	....	3	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....

SCHEDULE C.—*Continued.*

License District.	MUNICIPALITY.	Licenses Transferred and Removed						Total.			Amounts received for Provincial Licenses, Transfers Removals and Fines in each Municipality.			Proportion thereof paid to Municipalities.			REMARKS.
		Transfers.			Removals.												
		1888-9.	1889-90.	1890-91.	1888-89.	1889-90.	1890-91.	1888-9.	1889-90.	1890-91.	1888-89.	1889-90.	1890-91.	1888-89.	1889-90.	1890-91.	
											$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	
West York.	York, West of Yonge St.	....	3	2	....	....	....	10	12	9	1140 00	1005 00	840 00	500 66	461 56	368 32	
	Vaughan	1	2	1	....	....	....	10	12	11	1175 00	1330 00	1227 50	616 06	719 64	640 07	
	Etobicoke	2	....	1	....	....	....	7	5	6	392 50	450 00	515 00	124 48	152 20	170 08	
	Parkdale	....	....	....	....	....	....	3	..	....	940 00	....	....	665 82	....	....	
	Woodbridge, Village	....	....	..	....	....	....	3	3	3	480 00	480 00	480 00	204 50	211 32	204 00	
	Weston, Village	....	1	1	....	....	....	3	4	4	540 00	545 00	545 00	264 50	273 86	266 20	
	West Toronto Junction	....	....	1	....	....	....	3	7	8	600 00	1890 00	1287 50	324 68	1124 12	749 39	
	North Toronto, Village	....	....	1	....	....	....	....	....	4	....	....	515 00	....	....	174 15	
	Totals	....	....	....	....	....	....	....	....	....	470855 50	680560 55	680298 68	190297 79	297353 45	294968 26	

SCHEDULE D.

COMPARATIVE STATEMENT of the amount of Fines collected and the amounts paid in respect of Expenses of Commisioners and Salaries of Inspectors in each License District, for the license years 1888-9, 1889 90 and 1890-91 respectively.

LICENSE DISTRICT.	Fines Collected.			Paid in respect of Expenses of Commissioners and Salaries of Inspectors.		
	1888-9.	1889-90.	1890-91.	1888-9.	1889-90.	1890-91.
	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.
Addington	....	20 00	200 00	....	530 92	549 75
Algoma	323 20	148 25	160 00	485 08	404 65	443 57
Brant, North	....	70 00	140 00	....	587 70	567 09
Brant, South	....	40 00	....	....	346 42	379 00
Brantford	20 00	60 00	60 00	436 00	469 39	536 60
Brockville and Leeds	....	227 55	370 00	....	642 50	685 00
Bruce, Centre	650 00	217 00	140 00	498 15	459 00	500 20
Bruce, North	240 00	85 00	80 00	506 80	519 45	541 80
Bruce, South	540 00	138 00	248 00	527 05	604 50	595 35
Cardwell	481 00	255 75	288 00	544 90	573 60	565 57
Carleton	....	40 00	40 00	....	497 57	532 05
Cornwall	315 00	60 00	120 00	130 56	490 00	499 00
Dufferin	495 00	275 00	95 10	457 75	528 25	513 50
Dundas	325 00	226 00	536 00	485 29	558 77	560 29
Durham, East	....	27 00	144 00	....	516 50	511 65
Durham, West	....	190 00	380 00	....	595 09	550 00
Elgin, East	....	323 00	174 00	....	357 41	513 00
Elgin, West	....	400 00	220 00	....	500 00	657 45
Essex, North	150 00	390 00	260 00	594 44	734 86	785 97
Essex, South	415 00	14 00	195 00	546 52	554 50	542 00
Frontenac	....	50 00	90 00	....	498 75	516 00
Glengarry	260 00	180 00	100 00	555 28	610 00	597 50
Grenville	....	340 00	280 00	....	531 17	568 00
Grey, Centre	250 00	110 00	20 00	518 55	532 25	538 50
Grey, North	378 00	396 00	705 00	530 00	505 00	510 00
Grey, South	167 00	140 00	190 00	500 00	500 00	508 25
Haldimand	100 00	40 00	120 00	501 25	501 50	517 35
Haliburton	10 00	50 00	....	185 00	167 70	159 00
Halton	20 00	280 00	95 00	452 97	487 00	480 10
Hamilton	1777 00	1080 00	1200 00	1500 00	1200 00	1525 00
Hastings, East	80 00	260 00	84 00	565 50	557 50	572 00
Hastings, North	20 00	60 00	20 00	581 33	615 25	540 35
Hastings, West	439 85	334 80	390 00	1006 78	944 93	1108 62
Huron, East	50 00	130 00	130 00	572 89	622 00	622 00
Huron, South	84 00	180 00	230 00	540 88	608 00	634 00
Huron, West	410 00	310 00	340 00	563 89	607 00	642 50
Kent, East	....	610 00	370 00	....	605 71	611 75
Kent, West	....	304 00	641 90	....	621 00	623 00
Kingston	390 00	444 00	290 00	800 00	800 00	800 00
Lambton, East	....	110 00	200 00	....	418 00	473 75
Lambton, West	....	350 00	460 00	....	428 75	475 00
Lanark, North	....	615 00	305 00	....	443 75	462 00
Lanark, South	....	190 00	100 00	....	449 39	459 75
Lennox	....	76 00	210 00	....	431 25	516 50
Lincoln	....	269 35	468 06	....	398 91	471 25
London	603 83	390 00	804 00	900 00	901 00	941 12
Manitoulin	140 00	20 00	109 00	444 50	417 50	438 71
Middlesex, East	....	200 00	140 00	....	601 00	744 00
Middlesex, North	....	140 00	110 00	....	636 35	684 00
Middlesex, West	....	85 00	330 00	....	582 50	663 60
Monck	80 00	80 00	20 00	401 00	494 00	493 00
Muskoka	210 00	150 00	450 00	233 73	520 25	508 35
Nipissing	70 00	105 00	190 00	333 00	300 00	344 70
Norfolk, North	165 00	199 00	20 00	625 75	620 00	560 00
Norfolk, South	180 00	170 00	30 00	492 87	592 50	490 00

SCHEDULE D.

COMPARATIVE STATEMENT of the amount of Fines, etc., in each License District, for the license years 1888-9, 1889-90 and 1890-91 respectively.—*Continued.*

LICENSE DISTRICT.	Fines Collected.			Paid in respect of expenses of Commissioners and Salaries of Inspectors.		
	1888-9.	1889-90.	1890-1.	1888-9.	1889-90.	1890-1.
	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.
Northumberland, East	....	100 00	170 00	....	576 13	568 00
Northumberlaud, West	....	130 00	200 00	....	487 25	489 00
Ontario, North	....	40 00	245 00	....	596 30	643 90
Ontario, South	....	365 00	145 00	....	604 08	629 10
Ottawa	750 00	820 00	611 00	1553 33	1750 00	1650 00
Oxford, North	....	360 00	600 00	....	491 50	532 00
Oxford, South	....	250 00	50 00	....	586 30	646 50
Parry Sound	555 00	190 00	510 00	457 55	446 30	464 80
Peel	20 00	285 00	90 00	575 92	596 50	579 42
Perth, North	614 00	320 00	180 00	765 76	750 00	644 34
Perth, South	250 00	277 50	335 00	619 00	617 00	608 00
Peterborough, East	....	80 00	55 00	....	536 25	523 80
Peterborough, West	....	50 00	126 00	....	461 34	472 00
Prescott	155 00	293 00	40 00	474 00	513 75	486 76
Prince Edward	220 00	260 00	130 00	563 00	576 00	576 00
Rainy River	190 00	....	50 00	300 00	300 00	250 00
Renfrew, North	230 00	10 00	200 00	507 37	530 00	536 25
Renfrew, South	665 00	535 00	854 00	482 50	524 00	553 00
Russell	172 00	10 00	474 00	401 30	591 53	621 78
St. Catharmes	150 00	80 00	60 00	480 00	519 99	570 00
Simcoe, Centre	30 00	80 00	330 00	554 13	650 29	636 54
Simcoe, East	825 00	400 00	145 47	541 12	573 54	566 30
Simcoe, West	247 75	330 00	160 00	531 42	550 30	527 70
Stormont	20 00	60 00	20 00	487 24	550 00	615 00
Thunder Bay	365 00	170 00	240 00	495 00	495 00	498 00
Toronto	1290 00	1985 00	1530 00	3793 33	3787 70	3841 31
Victoria, East	....	150 00	266 50	....	313 95	284 05
Victoria, West	....	380 00	160 00	....	660 04	599 10
Waterloo, North	469 00	338 00	260 00	530 00	564 00	609 00
Waterloo, South	140 00	26 00	85 00	558 97	577 25	575 00
Welland	251 00	174 00	289 85	722 38	768 83	821 48
Wellington, East	....	100 00	80 00	....	600 26	603 46
Wellington, South	....	160 00	260 00	....	602 09	604 15
Wellington, West	....	85 00	224 00	....	631 65	633 25
Wentworth, North	182 00	45 00	65 00	514 00	589 00	511 75
Wentworth, South	290 00	150 00	159 25	635 95	476 75	528 00
York, East	....	110 00	350 00	509 60	557 00	547 85
York, North	455 00	200 00	290 00	511 00	510 00	528 40
York, West	80 00	20 00	140 00	529 58	537 50	528 80
Totals	18454 63	21073 20	22572 07	36411 16	56270 55	57931 68

SCHEDULE E.

STATEMENT showing Miscellaneous Expenditure incurred in each License District, including postage and stationery, printing, advertising, Magistrates' constables, witness, counsel and detective fees, etc., for the License year 1890-91.

LICENSE DISTRICT.	Amount.	LICENSE DISTRICT.	Amount.
	$ c.		$ c.
Addington	102 75	Middlesex, North	72 25
Algoma	113 28	Middlesex, West	160 92
Brant, North	142 80	Monck	102 45
Brant, South	125 81	Muskoka	87 40
Brantford, City	224 98	Nipissing	84 60
Brockville and Leeds	145 52	Norfolk, North	57 55
Bruce, Centre	84 79	Norfolk, South	111 85
Bruce, North	172 83	Northumberland, East	196 11
Bruce, South	258 15	Northumberland, West	266 72
Cardwell	177 81	Ontario, North	147 78
Carleton	54 63	Ontario, South	56 65
Cornwall	41 85	Ottawa	355 28
Dufferin	326 37	Oxford, North	145 33
Dundas	330 06	Oxford, South	92 72
Durham, East	191 28	Parry Sound	308 44
Durham, West	65 15	Peel	248 10
Elgin, East	189 56	Perth, North	187 82
Elgin, West	208 13	Perth, South	98 50
Essex, North	492 68	Peterborough, East	55 44
Essex, South	151 45	Peterborough, West	103 70
Frontenac	231 41	Prescott	115 16
Glengarry	124 15	Prince Edward	118 66
Grenville	190 64	Rainy River	157 50
Grey, Centre	49 95	Renfrew, North	70 39
Grey, North	199 23	Renfrew, South	468 62
Grey, South	62 06	Russell	194 58
Haldimand	79 27	St. Catharines, City	123 29
Haliburton	40 41	Simcoe, Centre	218 14
Halton	181 75	Simcoe, East	194 62
Hamilton	1,139 08	Simcoe, West	154 88
Hastings, East	114 38	Stormont	103 67
Hastings, North	57 92	Thunder Bay	154 11
Hastings, West	244 57	Toronto	2,521 86
Huron, East	204 87	Victoria, East	162 23
Huron, South	78 27	Victoria, West	204 57
Huron, West	149 60	Waterloo, North	112 85
Kent, East	325 38	Waterloo, South	90 23
Kent, West	321 28	Welland	153 71
Kingston, City	125 41	Wellington, East	99 15
Lambton, East	119 70	Wellington, South	298 49
Lambton, West	312 09	Wellington, West	198 58
Lanark, North	151 79	Wentworth, North	72 59
Lanark, South	87 83	Wentworth, South	105 40
Lennox	163 35	York, East	255 99
Lincoln	184 07	York, North	211 97
London	718 82	York, West	202 78
Manitoulin	90 78		
Middlesex, East	147 00	Total	19,198 77

RECAPITULATION

of Receipts and Expenditures, 1890-91.

Total Receipts, Schedule "C"		$680,298 68
Paid to Municipalities, Schedule "C"	$294,968 26	
" " the Province, " "A"	308,200 17	
" for Inspectors' salaries and Commissioners' expenses, Schedule "D"	57,931 68	
" for sundries, " "E"	19,198 57	
		$680,298 68

SCHEDULE F.

COMPARATIVE STATEMENT, shewing the number of Prisoners committed to the County Gaols for Drunkenness, during the years 1876, 1877, 1878, 1879, 1880, 1881, 1882, 1883, 1884, 1885, 1886, 1887, 1888, 1889, 1890 and 1891.

COUNTY OR DISTRICT.	1876	1877	1878	1879	1880	1881	1882	1883	1884	1885	1886	1887	1888	1889	1890	1891
Algoma	8	4	4	24	19	17	24	21	15	12	1	85	128	64	69	77
Brant	97	84	75	63	81	64	80	75	58	28	91	112	147	218	182	112
Bruce	1	2	17	8	2	14	4	10	3	....	2	6	22	8	6	7
Carleton	387	319	283	272	222	269	265	261	314	205	280	286	297	296	336	204
Dufferin	....	....	....	...	....	1	....	....	1	1	3	3	1	4	2	1
Elgin	31	41	47	54	53	45	61	92	82	57	30	25	29	23	20	32
Essex	87	55	60	59	71	51	91	121	103	47	31	45	46	47	35	57
Frontenac	143	137	139	126	102	53	25	46	75	74	58	108	107	139	129	125
Grey	15	13	14	35	40	23	23	19	28	36	20	21	29	27	17	13
Haldimand	7	2	6	10	15	6	4	7	7	18	15	17	24	25	15	22
Halton	21	15	6	1	6	5	4	7	6	9	13	5	19	13	9	9
Hastings	20	13	43	34	16	35	67	57	50	45	34	51	67	39	49	34
Huron	24	29	22	15	22	18	8	5	4	3	4	....	4	2	5	5
Kent	24	20	20	33	24	13	28	23	26	18	14	7	9	61	71	47
Lambton	123	84	142	115	120	77	77	75	105	130	72	38	64	99	108	95
Lanark	7	6	10	8	7	10	4	9	7	6	4	9	4	2	5	5
Leeds and Grenville	84	69	84	71	72	56	67	19	135	80	36	24	31	52	58	44
Lennox and Addington	6	4	5	9	11	14	11	18	20	6	3	8	7	4	22	23
Lincoln	56	98	68	51	44	55	41	65	39	29	21	21	28	33	24	12
Middlesex	155	106	211	193	235	210	242	269	445	277	338	404	408	540	332	213
Muskoka and Parry Sound	2	9	8	6	8	3	13	8	16	84	39	8	6	45	28	19
Nipissing	....	....	...	1	1	....	2	10	17	6	....	13	32	81	97	96
Norfolk	11	35	21	15	26	14	18	18	17	4	6	5	3	17	3	10
Northumberland & Durham	56	67	38	24	25	20	10	21	26	26	15	6	12	28	38	22
Ontario	10	10	12	11	6	2	5	10	1	4	....	....	....	5	2	....
Oxford	57	30	46	55	54	47	32	28	51	21	28	....	64	55	51	34
Peel	32	45	22	27	14	9	14	4	10	24	10	8	24	28	30	17
Perth	54	75	56	35	39	26	20	37	14	17	15	12	9	16	14	4
Peterborough	5	11	5	5	27	27	38	71	30	27	13	11	26	20	45	24
Prescott and Russell	2	6	....	....	1	1	2	2	....	3	1	....	....	2	...	5
Prince Edward	31	29	22	46	75	60	76	70	46	41	54	20	45	38	33	19
Renfrew	2	3	2	5	10	10	24	17	27	11	2	2	..	4	1	....
Simcoe	66	91	133	82	107	62	56	87	99	31	35	16	28	46	34	34
Stormont, Dundas and Glengarry	7	33	18	17	3	4	7	8	9	3	1	4	7	29	25	14
Thunder Bay	78	105	95	81	83	126	88	296	705	153	119	148	148	135	125	120
Victoria and Haliburton	22	32	25	10	7	8	14	7	20	13	1	2	4	4	7	1
Waterloo	13	10	4	28	11	11	10	14	11	7	4	8	12	20	17	13
Welland	69	101	321	188	186	145	50	34	23	33	40	32	12	21	16	7
Wellington	41	36	26	23	40	36	51	93	49	32	12	22	21	10	10	4
Wentworth	259	396	382	382	447	339	396	376	295	368	385	373	429	401	418	251
York	1755	1807	1293	1359	1463	1342	1445	1485	1661	1707	1705	2166	2098	2096	2085	1783
Total	3868	4032	3785	3581	3795	3328	3497	3897	4650	3696	3555	4130	4451	4797	4573	3614

SCHEDULE G.

Names and Post Office Addresses of the Inspectors of Licenses of the several License Districts throughout the Province.

License District.	Inspector.	P. O. Address.
Addington	James M. Smith	Tamworth.
Algoma	A. G. Duncan	Sault Ste. Marie.
Brant, North	Geo. Pike	Brantford.
Brant, South	Isaac B. Merritt	Scotland.
Brantford, City	Southworth Cole	Brantford.
Brockville and Leeds	R. R. Phillips	Caintown.
Bruce, Centre	John Irving	Paisley.
Bruce, North	Alexander McCannel	Port Elgin.
Bruce, South	Angus Stewart	Lucknow.
Cardwell	G. N. Clark	Beeton.
Carleton	John O'Callaghan	Kars.
Cornwall	William Pollock	Cornwall.
Dufferin	Thomas Anderson	Orangeville.
Dundas	Asa Beach	Iroquois.
Durham, East	E. A. Powers	Port Hope.
Durham, West	W. R. Climie	Bowmanville.
Elgin, East	Asa Miller	Aylmer.
Elgin, West	Alexander Beaton	West Lorne.
Essex, North	Thomas J. Elliott L. N. Castainer, Assistant Inspector	Windsor.
Essex, South	Alanson Elliott	Oxley.
Frontenac	John Dawson	Wolfe Island.
Glengarry	Archibald McNab	Alexandria.
Grenville	Charles Chapman	Prescott.
Grey, Centre	James Campbell	Clarksburg.
Grey, North	C. C. Pearce	Owen Sound.
Grey, South	Thomas A. Harris	Durham.
Haldimand	Hiram Gee	Fisherville.
Haliburton	R. C. Garratt	Minden.
Halton	W. D. Brothers	Milton.
Hamilton	J. I. Mackenzie Frederick Walter	Hamilton.
Hastings, East	Michael Lally	Belleville.

SCHEDULE G.—*Continued.*

LICENSE DISTRICT.	INSPECTOR.	P. O. ADDRESS.
Hastings, North	Edward Mouncey	Madoc.
Hastings, West	James St. Charles	Belleville.
Huron, East	John R. Miller	Jamestown.
Huron, South	Wm. Ballantyne	Seaforth.
Huron, West	Wm. J. Paisley	Clinton.
Kent, East	Thomas Boon	Bothwell.
Kent, West	Israel Evans	Chatham.
Kingston	William Glidden	Kingston.
Lambton, East	H. G. Taylor	Wyoming.
Lambton, West	Rueben C. Palmer	Sarnia.
Lanark, North	J. D. Robertson	Almonte.
Lanark, South	John McCann	Perth.
Lennox	W. A. Rose	Napanee.
Lincoln	R. Fowlie	St. Catharines.
London	Robert Henderson	London.
Manitoulin	J. B. White	Manitowaning.
Middlesex, East	John Durand	Dorchester Stat'n.
Middlesex, North	Daniel Schoff	Clandeboye.
Middlesex, West	W. C. Robertson	Mt. Bridges.
Monck	L. Massecar	Dunnville.
Muskoka	Elijah F. Stephenson	Bracebridge.
Nipissing	Napoleon Fink	Mattawa.
Norfolk, North	W. F. Nickerson	Simcoe.
Norfolk, South	James E. Decon	Port Dover.
Northumberland, East	Patrick Gallagher	Warkworth.
Northumberland, West	James Bulger	Cobourg.
Ontario, North	E. J. reen	Uxbridge.
Ontario, South	John Ferguson	Whitby.
Ottawa	John O'Reilly Geo. E. St. George, Asst. Insp. & Prov. Officer.	Ottawa.
Oxford, North	William G. McKay	Woodstock.
Oxford, South	Gordon H. Cook	Ingersoll.
Parry Sound	William Ireland	Parry Sound.

SCHEDULE G.—*Continued.*

License District.	Inspector.	P.O. Address.
Peel	Joseph Foster	Brampton.
Perth, North	Alexander M. Fisher	Amulree.
Perth, South	John S. Coppin	Mitchell.
Peterborough, East	John James Crowe	Warsaw.
Peterborough, West	George Cochrane	Peterborough.
Prescott	James H. Malloy	Fournier.
Prince Edward	D. L. Bongard	Picton.
Rainy River	Frank Gardner	Rat Portage.
Renfrew, North	Alfred J. Fortier	Pembroke.
Renfrew, South	John Connolly	Admaston.
Russell	Daniel McLaurin	Metcalfe.
St. Catharines	R. Fowlie	St. Catharines.
Simcoe, Centre	John W. Morrow	Barrie.
Simcoe, East	Angus McKay	Orillia.
Simcoe, West	Geo. Dinwoody	Alliston.
Stormont	Donald P. McKinnon	South Finch.
Thunder Bay	W. H. Hesson	Port Arthur.
Toronto	Thomas Dexter, Chief John Wilson Thomas A. Hastings	Toronto.
Victoria, East	John Short	Lindsay.
Victoria, West	John Short	Lindsay.
Waterloo, North	Benjamin Devitt	Waterloo.
Waterloo, South	M. A. Abbey	Preston.
Welland	Archibald Thompson, jr	Welland.
Wellington, East	John Macdonald	Elora.
Wellington, South	W. S. Cowan	Guelph.
Wellington, West	T. Flath	Drayton.
Wentworth, North	Joseph Bowman	Dundas.
Wentworth, South	Thomas Macklem	Hamilton.
York, East	James Eckhart	Unionville.
York, North	William Malloy	Newmarket.
York, West	Robert Wilcock	Richview.

TWENTY-SECOND ANNUAL REPORT

OF THE

ENTOMOLOGICAL SOCIETY

OF ONTARIO

1891.

PRINTED BY ORDER OF THE LEGISLATIVE ASSEMBLY.

TORONTO.
PRINTED BY WARWICK & SONS, 68 AND 70 FRONT STREET WEST
1892.

INDEX.

PAGE.
Acanthoderes decipiens.............. 79
Acridium Americanum.............. 46
“ frontalis.................. 69
Acronycta funeralis 21
Actias luna.......... 33
Agrilus ruficollis 52
“ torpidus.................... 80
Agrotis annexa 55
“ campestris 12
“ ochrogaster 8, 12, 16
“ turris 8, 16
Alaus oculatus..................... 80
Aldrich, J. M., Article by 81
Allorhina nitida 50
Alwood, W. B., Articles by......... 75, 82
Alypia octomaculata................ 77
Among the Moths and Butterflies; Ballard 97
Animals Injurious and Beneficial to Agriculture, Manual of......... 97
Anisopteryx pometaria....... 11
“ vernata.................. 11
Annual Address of President........ 10
Annual Meeting of Association of Economic Entomologists........ 35
Annual Meeting Entomological Society of Ontario...................... 2
Anthonomus quadrigibbus 8
Apple borer 64
“ leaf folder, the lesser......... 11
Argytes longulus................... 21
Atkinson, G. F., Article by......... 55
Bag-worm......................... 76
Beckwith, M. H., Article by 63
Bembecia marginata 53
Bethune, Rev. C. J. S., Articles by.. 10, 96, 98, 99
Beutenmuller, W., Article by 96
Birds, list of those known to breed in Middlesex County.............. 21
Blackberry borers and gall makers... 51
Book Notices. 96
Borers, Notes on...... 79
Botanical Section, Report of 16
Bruchus pisi....... 12
Bruner, L., Article by............. 45
Butterflies of North America........ 15, 99
Cacæsia rosaceana.................. 11
Callosamia promethea 31
Caloptenus bivittatus. 69
“ differentialis 69
Camnula pellucida.................. 46
Can insects survive freezing?........ 17
Canker-worms. 11
Cattle ticks.... 57
Chilo saccharalis 49
Chinch-bug disease................. 83
“ loss from.............. 40
Chrysophanus thöe................. 8
Clisiocampa... ....13, 16, 76
Clover leaf beetle..... 63
“ seed caterpillar.............. 73
Cœlinius meromyzæ................ 12
Colias interior 8
“ philodice, var. Laurentina 8
Collections in England and Germany. 30
Colorado potato beetle.............. 50
Cook, A. J., Articles by........... 77, 81
Corn bill-bug...................... 65
“ crambid 63
Cotton aletia 40, 57
“ cut-worm................... 55
Council, Report of................. 9
Crambus caliginosus............... 63
Cucumber beetle................... 13
Curator, Report of............ 4
Cut-worms 12, 16
Danais archippus 34
Davis, G. C., Article by 79
Dendrotettix longipennis 46
Diabrotica longicornis 42
“ vittata................. 13, 64
Diagrams of insects 15
Diplosis pirivora.................. 65
Dissosteira longipennis....45, 62, 70, 72, 85
“ obliterata.............. 46
Economic Entomologists, Association of 35
Edwards' Butterflies of North America 15, 99
“ Henry, Death of.......... 95
“ “ Bibliographical catalogue of described Lepidoptera .. 99
Edwards, W. H., Article by......... 97
“ Visit to........... 20
Election of Officers................ 2, 67
Elm beetle 77
“ borer....................... 77
Enchodes sericea.................. 80
Entomological Club, A.A.A.S 85
“ work in Central Park . 76
Entomoscelis adonidis 16, 21
Ephestia Kuhniella 18
Erebus odora.......... 21
Experimental Farms, annual report of. 98
Eye-spotted bud-moth........... ... 10, 15
Fall web-worm 13, 76
Fletcher, J., Articles by 35, 86, 100
Forest and Shade Trees, Insects Injurious to 14
Fossil insects.................. 15

PAGE.
Fyles, Rev. T. W., Articles by 5, 27
Geddes, G., Article by 30
Gonioctena pallida 81
Gortyna cataphracta 21
Gossard, H. A., Article by 73
Government Work and the Patent Office 66
Grapholitha interstinctana 41, 73
Grasshoppers, trip to investigate damages from 68
Gryllotalpa borealis 8, 86
Guignard, J. A., Article by 98
Hæmatobia alcis 95
“ serrata 95
Hair snakes 8
Harrington, W. H., Article by 89
Hippodamia convergens 57
Historic notes 77
Horn fly 58, 82, 95
Howard, L. O., Article by 67
Hyphantria cunea 76
“ textor 13
Insecta: Hyatt and Arms 96
Insects and insecticides; Weed 100
Japanese insects, notes on 89
Kellicott, D. S., Article by 58
Kerosene emulsions, experiments with 78
“ “ and pyrethrum 55
Larch saw fly 13, 27
Leptura proxima 79
Librarian, report of 4
Library, resolution respecting 4
Life areas, note on 22
Locusts, destructive 8, 45, 68
“ occurrence of, in 1891 45, 62
Lycæna Couperi 8
“ lygdamus 8
Lyctus striatus 80
Lyman, H. H., Articles by 17, 26, 99
Maple borers 79
Mediterranean flour-moth 18
Melanoplus atlanis 47
“ bivittatus 47
“ devastator 47
“ differentialis 47
“ femur-rubrum 47
“ ponderosus 47
“ spretus 46
Melitæa Carlota 21
Melittia cucurbitæ 54
Meromyza Americana 12
Microscopical examination of unexpanded wing of C. promethea 31
Microscopical section, report of 5
Moffatt, J. A., Article by 31
Mole-cricket, the northern 8, 86
Montreal Branch, report of 2
Moose fly 95
Myrmeleon abdominalis 21
Mytilaspis pomorum 13
Nematode leaf disease 55
Nematus Erichsonii 13, 27
Notes of interest 50
“ the season 57, 58, 63, 81
Oak borers 80

PAGE.
Obituary 95
Oblique-banded leaf-roller 11
Orgyia leucostigma 76
Ormerod, Miss G. E 15
“ Miss E. A 14
“ “ Article by 58
Ornithological Section, report of 4
Osborn, H., Articles by 68, 73, 78
Oyster-shell bark-louse 13
Packard's Forest-tree insects 14
Pamphila Manitoba and its varieties 26
Parasites, note on 67
“ of grasshoppers 73
Paris green, use of 13, 57, 58, 78
Peach borer 64
Pear-tree slug 13
Pea weevil 12, 16
Phyllotreta vittata 12
Phymatodes dimidiatus 80
Phytonomus punctatus 63
Plum curculio 65
Pœcilonota cyanipes 80
Popenoe, E. A., Article by 62
Poplar gonioctena 81
Prionus laticollis 53
Pyrgus cæspitalis 21
“ centaureæ 21
Pyrethrum powder 55
Report of Botanical Section 16
“ Council 9
“ Delegate to Royal Society 5
“ Librarian and Curator 4
“ Microscopical Section 5
“ Montreal Branch 2
“ Ornithological Section 4
“ Treasurer 3
Riley, C. V., Articles by 55, 66
Sannina exitiosa 64
Saperda candida 64
“ concolor 80
Scudder's Fossil insects 15
Selandria cerasi 13
Silk culture, note on 79
Silver-top in grass 12
Smith, J. B., Articles by 51, 54, 63
Snow, F. H., Article by 83
Snow, W. A., Article by 95
Southwick, E. B., Article by 76
Sphenophorus sculptilis 65
Spray machinery, standard fittings for 75
Squash borer 54
Statistics of loss from insects 40, 43
Tent caterpillars 13, 16
Teras minuta 11
Tmetocera ocellana 10
Townsend, C. H. T., Articles by 49, 50
Treasurer, report of 3
Turnip flea-beetle 12
Ulochætes leoninus 8
Vanessa Californica 8
Wallace, P., Article by 79
Warble fly 60
Weed, H. E., Article by 57
White grub of Allorhina 50
Willow galls 81

TWENTY-SECOND ANNUAL REPORT

OF THE

ENTOMOLOGICAL SOCIETY OF ONTARIO.

To the Honorable the Minister of Agriculture:

SIR,—I have the honor to present herewith the twenty-second annual report of the Entomological Society of Ontario, in accordance with the provisions of our Act of Incorporation.

The annual meeting of the Society was held in London, on the 25th and 26th of November, 1891; the lateness of the meeting being caused by the severe illness of our President, who was on that account unable to attend earlier. At this meeting many papers of interest were read, the reports of officers received, officers for the ensuing year elected, and general business connected with the conduct of the Society transacted. The first reports were also received from the sections engaged on other branches of science, by whose work the Society hopes to be much benefited. The various reports of the officers and sections, together with the audited annual statement of the Treasurer, the annual address of the President, the papers read at the annual meeting and the report of our delegate to the Royal Society of Canada, will be found in the following pages. There is also presented a full report of the very important meeting of the Association of Economic Entomologists held in Washington in August last, under the presidency of our Vice-President, Mr. James Fletcher. This Society was first organised in Toronto in 1889, and now includes amongst its members all the leading scientists in North America who are engaged in the study of practical entomology; its proceedings are therefore of the highest interest and value to all concerned in any department of agriculture or horticulture.

The *Canadian Entomologist* continues to be issued regularly and is now the oldest Entomological publication in America. It numbers amongst its contributors the ablest students of the science in the United States as well as in Canada, and also some celebrated Entomologists in Europe.

I have the honor to be, Sir,
Your obedient servant,

W. E. SAUNDERS,
Secretary.

ANNUAL MEETING OF THE SOCIETY.

The annual meeting of the Entomological Society of Ontario was held in its rooms in Victoria Hall, London, on Wednesday and Thursday, November 25th and 26th, 1891; the President, Rev. C. J. S. Bethune, Warden of Trinity College School, Port Hope, occupying the chair.

On Wednesday morning, at 10 o'clock, a Council meeting was held, at which their annual report was prepared and adopted, the mailing list of the *Canadian Entomologist* was carefully gone over, and other business was transacted.

At 2 p.m. a general meeting of the Society was held, at which the following members were present:—The President; Rev. T. W. Fyles, South Quebec; Messrs. James Fletcher and W. H. Harrington, Ottawa; G. Geddes, Toronto; J. M. Denton, W. E. Saunders, J. A. Moffat, H. Stevenson, N. Stevenson, Foote and Roger, London.

ELECTION OF OFFICERS.

The following gentlemen were elected officers for the ensuing year:—

President—Rev. C. J. S. Bethune, M.A., D.C.L., Port Hope.
Vice-President—W. Hague Harrington, Ottawa.
Secretary—W. E. Saunders, London.
Treasurer—J. M. Denton, London.
Directors—Division 1—James Fletcher, F.R.S.C., Ottawa.
Division 2—J. D. Evans, Sudbury.
Division 3—Gamble Geddes, Toronto.
Division 4—A. H. Kilman, Ridgeway.
Division 5—J. Alston Moffat, London.
Librarian and Curator—J. A. Moffat, London.
Editor of the *Canadian Entomologist*—Rev. Dr. Bethune, Port Hope.
Editing Committee—H. H. Lyman, Montreal; J. Fletcher, Ottawa; Rev. T. W. Fyles, South Quebec.
Delegate to the Royal Society of Canada—The President.
Auditors—J. H. Bowman and W. E. Saunders, London.

REPORT OF THE MONTREAL BRANCH.

The following, the eighteenth annual report of the Montreal Branch of the Society, was read and adopted:—

The Council in submitting their report for the year 1890-91 are pleased to be able to state that the year has been one of decided progress.

Ten monthly meetings, most of which were well attended, have been held during the year; the June meeting, held at the residence of Mr Trenholme, Cote St Antoine being principally devoted to collecting moths.

The presence of Mr James Fletcher, Vice President of the parent society at the Febuary meeting, and of the Rev. Mr Fyles of Quebec, on several other occasions gave an increased interest to those meetings, and the Branch is indebted to these gentlemen for the interest they have taken in its success.

During the year, one old member Mr E. D. Wintle has rejoined, and one new one Mr H B. Cushing has been added to our roll.

The following papers have been read during the year:

1. Notes on Argynnis freya, A. Chariclea and A. Myrina. H. H. Lyman.
2. Notes on Coleoptera (several papers.) J. F. Hausen.
3. A Day in the Woods. Rev. T W. Fyles.

4. Notes on the Lepidoptera of 1890. A. F. Winn.
5. Description of a New Species of Pterostichus (P. Horni) J. F. Hausen.
6. Quebec representatives of the genus Plusia. Rev. T. W. Fyles.
7. Diseases of the Chrysanthemum caused by Insects, J. G. Jack, (selected.) F. B. Caulfield.
8. Tortoise Beetles. F. B. Caulfield.
9. On the occurrence of Gracilia minuta at Montreal. J. F. Hausen.
10. A preliminary paper on the genus Chionobas. H. H. Lyman.
11. Notes on Gryllidae, Field Crickets. F. B. Caulfield.
12. Notice of three new Species of Pterostichus. J. F Hausen.
13. Notes on some methods of collecting insects. H. F Winn.
14. Report on a collection of Lepidoptera from the north of Lake Huron. H. H. Lyman.
15. Can Insects survive freezing? H. H. Lyman.

Of the above, Nos. 1 and 9 have been published in the *Canadian Entomologist*; 3, 6 and 8 in the Annual Report for 1890; and 5 and 12 in the *Canadian Record of Science*.

The report of the Treasurer shows that the Branch is flourishing financially.

The Council would again urge upon the members increased activity in the collection and study of the insects of all orders in this locality, and especially of the more neglected ones, in order that we may obtain a better knowledge of those occurring here.

Only about 1,400 species are as yet recorded, and this number could be very materially increased by even one summer's careful work.

Your Council would suggest that occasional collecting excursions be held during the coming summer, as a means of stimulating the interest of the members in this science.

Respectfully submitted on behalf of the Council.

H. H. LYMAN, President.

The following officers were elected for the coming year:—President, H. H. Lyman; Vice President. F. B. Caulfield; Secretary-Treasurer, A. F. Winn; Members of Council, J. F. Hausen and W. C. Adams.

(Signed) A. F. WINN, Secretary.

REPORT OF THE TREASURER.

The Treasurer Mr. J. M. Denton, presented his annual statement of the finances of the Society and explained the various items to the meeting. On motion it was adopted as follows:—

RECEIPTS, 1890-91.

Balance from last year	$153 90
Membership fees	292 88
Sales of *Canadian Entomologist*	192 16
Pins, cork, etc	73 32
Government grant	1,000 00
Interest	6 07
	$1,718 33

EXPENDITURE, 1890-91.

Printing *Canadian Entomologist*, etc	$595 96
Report and meeting expenses	210 25
Library	33 55
Purchase of Collection	50 00
Expense account (postage, stationery, etc)	92 50
Rent	120 00
Insurance	35 00
Pins, Cork, etc	48 00
Grants to Editor and Curator	293 14
Balance	239 93
	$1,718 33

We certify that the above is a correct statement of accounts for the year ending August 31st 1891, of the Treasurer of the Entomological Society of Ontario, as shown by the books and vouchers.

(Signed) W. E. SAUNDERS,
J. H. BOWMAN.

REPORT OF THE LIBRARIAN AND CURATOR.

Mr J. A. Moffat presented and read the following report, which was, on motion adopted :

The library was completely gone over in the beginning of the year, and each book checked by its No. in the library register, when it was discovered that there were five volumes that could not be accounted for, viz: Nos. 100, 296, 619, 729, 994.

102 books, including a gift of 38 volumes from the President, have been added to the library during the year ; the full number on the register being 1,168.

According to a suggestion at a previous meeting, a sectional catalogue has been commenced, which, if approved and published, will inform the members what books in the library deal with entomological subjects.

The number of volumes issued to local members during the year was 74.

Exchanges, such as reports and proceedings of societies, bulletins, magazines and periodicals of various kinds received during the year, average thirty per month.

As recommended by the Secretary, and approved of at the last annual meeting, an inventory of the back volumes of the *Canadian Entomologist* was taken. The information obtained thereby enabled the Society to offer some of the volumes to members at reduced rates, which were taken advantage of by many.

The Society's collection of native lepidoptera has been almost entirely renewed, and many additions made of recent captures, making it a good representative collection of Ontario lepidoptera up to date.

It is to be regretted that the coleoptera collection still remains in a very defective state, many blanks requiring filling in.

The other orders of native insects remain about the same, with no chance of extension, from a want of cabinet accommodation.

The exotics, so greatly increased by the purchase of the Pettit collection, have been made conveniently accessible, and have been a source of much interest and gratification to visitors.

A beginning has been made in arranging the European collection of coleoptera, which, when completed, will be valuable for reference, and the duplicates made available for sale or exchange.

An effort has been made to catalogue the wood-cuts and electrotypes, giving the No. of the drawer in which they are to be found, the name of what the cut represents, and the number of the annual report in which it has been described, which, when perfected, will enable anyone to trace the cut required with comparative ease.

Respectfully submitted,

(Signed) J. A. MOFFAT,
Librarian and Curator.

RESOLUTION *re* LIBRARY.

The following resolution regarding the library was adopted :—

That the chairmen of the various sections of the society, and the librarian be appointed a committee to draw up regulations for the use of the librarian, the same to be submitted for approval to the President and Mr. Fletcher, after which they shall be published with the catalogue.

It was also moved and resolved "that the thanks of the Entomological Society of Ontario be given to Professor Penhallow, of McGill University, Montreal, for interesting specimens of an East Indian Rhyncophorous beetle kindly presented by him to the Society's cabinet.

The reports of the sections of the Society being called for, Mr. Saunders presented and read the following :

REPORT OF THE ORNITHOLOGICAL SECTION.

To the Council of the Entomological Society of Ontario.

GENTLEMEN,—In presenting the first report of the London Ornithological Section of the Entomological Society, it is fitting that the Section should acknowledge its indebtedness for the privileges enjoyed, and for the opportunity of organizing under the ægis of the Entomological Society. The advantages of being in touch with the more important of the other branches of natural history, and of having experts to refer to in matters of dispute or inquiry, are not easily overestimated. Under such circumstances the section has made good progress during the time since its commencement. The membership, while not large, is enthusiastic, and meetings, at which the attendance has been very good, have been held monthly or oftener, ever since inauguration. The section has compiled a list, presented herewith, of the birds breeding in Middlesex County, as well as supplementary lists of probable present and probable former breeders, of whose breeding we have not specific evidence. To this is added a short note on "Faunal Areas," from which point of view Middlesex occupies a peculiarly interesting position as a borderland, on which the different areas appear to meet.

(Signed) W. E. SAUNDERS, Chairman.
W. A. BALKWILL, Secretary.

In connection with this section a paper was read by Mr. R. Elliott on "Life Areas," referring to the distribution of birds in the neighbourhood of London ; and a list was presented by Mr. W. E. Saunders of the various birds known to breed in the County of Middlesex.

REPORT OF THE MICROSCOPICAL SECTION.

Of the Entomological Society was presented and read by Mr. Foote, as follows:

As no report of the meetings since organisation has been made to the Society, I have much pleasure in presenting the following:—

Upon March 15th, of last year (1890) a meeting was held in these rooms to consider the advisability of organizing a microscopical section. Prof. Bowman was elected chairman *pro tem.* The meeting was called at 8 o'clock. Those present, Messrs. Bowman, Dearness, Arnott, Stevenson, Foote, Magee, Wilson, and Drs. Hodge, Gardner, Arnott and Hotson, all expressed their opinion in favour of the movement, and the section was fully organized, appointing Mr. Denton permanent chairman. Meetings were held regularly upon the second and fourth Friday of each month, from that time till postponement at last general meeting, held in April, and opened again upon Friday, Oct. 9th.

The meetings and attendance are as follows:

12 regular meetings; 4 open, (3 for the public, and one for the benefit of the ladies of Hellmuth College).—Total, 16 meetings and one outing. Average attendance of members, 10.

The following are some of the subjects taken up. For a fuller report I refer you to the minute book:—

Manipulation of the Microscope
Angular Aperture
Chromatic and Spherical Aberration.
Test objects—Pleurosigma, Heliopelta. } Prof. BOWMAN.

Mounting and Mounting-media—Mr. BURKHOLDER.
Fungi—Mr. J. DEARNESS.

Examination of Algae, Spyrogyra, Draparnaldia,
Oscillatoria; A Sexual division of Spyrogyra. } Mr. BURKHOLDER.

Black Knot—Mr. J. DEARNESS.

Fertilisation and Growth of Ferns
Structure of an Exogen. } Mr. J. DEARNESS.

Examination of the results of an outing to the ponds—Daphnia, Cyclops—an unknown larva found in the pitchers of the pitcher plant. Drawings were taken for future reference.

LONDON, Nov. 25, 1891.

REPORT FROM THE ENTOMOLOGICAL SOCIETY OF ONTARIO TO THE ROYAL SOCIETY OF CANADA.

BY THE REV. THOMAS W. FYLES, F. L. S., DELEGATE.

Canadian Entomology is the outgrowth of the last thirty years, and in its development the Entomological Society of Ontario has played no unimportant part.

The first movement towards the formation of this Society was made in 1862; and at that time according to the statement of the naturalist Grote (19th Report of the Entomological Society of Ontario, p.62), there were probably not one hundred species of Lepidoptera named and determined in any collection on this continent. The Society was fully organized on the 16th of April, 1863. In August of 1868 it commenced the publication of its monthly organ, the *Canadian Entomologist*, which ante-dated by one month the *American Entomologist*, edited by Walsh and Riley. In 1871 the Society was duly incorporated, and since then, under the fostering care of the Ontario Government, it has maintained its important position as one of the leading Entomological societies on the continent of America.

One of the conditions of the Act for its incorporation, was, that it should present to the Minister of Agriculture for Ontario, an annual report of its proceedings. Twenty-one such reports have now been issued, the whole embodying a vast amount of valuable entomological information.

The report for 1890 contains an account of the proceedings at the annual meeting of the Society, the address of the president, and the various reports and papers read on that occasion. It contains also, full and interesting notes of the proceedings at the Indianapolis meeting of the Entomological Club of the American Association for the advancement of Science, and of the American Association of Economic Entomologists held at Champaign, Illinois. These notes were presented by Mr. Fletcher, who had attended the meetings of the associations as the Society's representative. They are followed in the report by various original papers, thought to be of interest both to entomologists and to the general public. The titles to these are: "Kitchen Garden Pests and How to Deal with Them"; "An Outbreak of the Army Worm in Maryland"; "Tortoise Beetles"; "Quebec Representatives of the Genus *Plusia*"; "Origin and Perpetuation of Arctic Forms"; "Fuller's Rose Beetle"; "Hymenoptera Parasitica"; "Insects Injurious to the Elm"; "The Entomology of Shakespeare"; and "Experiments for the Destruction of Chinch Bugs." The rest of the report is made up with selections, and notices and critiques of the most important entomological publications that had appeared in the course of the year.

The *Canadian Entomologist* has reached its twenty-third volume. It is still under the able management of the Rev. Dr. Bethume, D.C.L. It has now been permanently enlarged to twenty-four pages, and "continues to receive contributions from all the most eminent entomologists in North America, and to circulate in all parts of the world." (21st report, introductory letter from the Secretary to the Honorable the Minister of Agriculture). In the volume for 1890, articles appear from thirty-five contributors who are pursuing their investigations in various parts of British North America, the United States of America, Great Britain, British India and Germany. No less than seventeen new species of insects are described in its pages.

The constitution of the Society provides for the formation of branch associations; and in Montreal an important branch has flourished for a length of time. It was chiefly through the instrumentality of Mr. F. B. Caulfield, that this branch was called into existence; and it still enjoys the benefit of his services as vice-president. Under the presidency of Mr. H. H. Lyman, the branch is raising up a number of young and enthusiastic entomologists who give promise of attaining eminence in their favourite pursuit. At its monthly meetings original papers have been read, and descriptions of several species of beetles discovered by Mr. J. F. Hausen, one of its members, have been given. The secretary of the branch is Mr. A. F. Winn.

The scheme for the formation of sections, which was put into operation last May, continues to work admirably. The sections formed in London, the head-quarters of the Society, are four:—the Botanical, the Ornithological, the Geological and the Microscopical, all of which are doing good work. The value of all these sections to the parent society will be readily perceived: of the Botanical, in determining the food plants of insects, and in tracing insect ravages and their effects; of the Ornithological, in discovering what insectivorous birds act as checks upon the undue increase of particular kinds of insects, and in answering such inquiries as that which called forth a volume from the United States Agricultural department—whether the English sparrow (which was said to destroy large numbers of injurious larvæ) was of benefit to the community or not; of the Geological, in showing what kinds of soils are favourable to the growth of certain food plants, and thus indicating the localities for particular insects, and also in tracing the impressions left by extinct species in various Geological formations; and the Microscopical, in noting the structural peculiarities of insects, and in aiding to classify minute forms.

The Botanical section numbers 16 members. Its chairman is Mr. J. Dearness; vice-chairman, Professor Bowman, and secretary, Dr. S. Carson. Meetings for study and mutual assistance are held by it every Saturday evening, from 1st of May, until 1st of October. A number of excursions have been carried out, and some new species added to the already well examined flora of the environs of London. Two new mosses have been discovered by Mr. Dearness, and a surprisingly large number of new fungi—more than 60 now named, and some yet unnamed. These fungi are for the most part new not to Canada only, but also to the whole of America.

The Ornithological section also is flourishing. It is engaged in gathering up facts of general import to ornithology, and is commencing a systematic list of the breeding-birds of Middlesex county to be presented at the annual meeting of the Society. Its chairman is Mr. William Saunders, and its secretary, Mr. N. O. Balkwell.

The Geological section has nine members. Dr. S. Wolverton being chairman, Mr. T. Green vice-chairman, and Mr. J. L. Goodburne, secretary. The members have made regular weekly excursions, and the district around London has been well worked by them, and numerous interesting fossils have been added to the Society's collections; taken altogether the year's work done by this section has been very satisfactory. The interest of the members has not flagged at any time, but each has seemed anxious to do what he could towards adding to the general stock of information.

The Microscopical section has also been active. It numbers twelve members, and it has in use eleven first class microscopes. Ten meetings have been held by the members for private study, and two public entertainments for the benefit of the young people of the city have been given.. Special attention has been paid by this section to fungi, mildews upon fruit trees, rust in wheat, etc. Mr. John Denton is chairman of the section, and Messrs. Bowman and Dearness, microscopical directors.

It is generally conceded that the formation of these sections was a happy procedure that strengthened the Society and increased its usefulness.

At the last annual meeting the Society secured the services of Mr. J. Alston Moffatt one of its members who engaged to take entire charge of the Society's rooms, library and collections, and to be a permanent resident official in London. It is felt that the greatest care will be taken by Mr. Moffatt for the preservation and arrangement of the Society's valuable collections of insects. These have lately been enlarged by the purchase from Mr. Johnson Pettit of Grimsby, of several well filled and well-arranged cabinets of coleoptera, etc., the results of many years' intelligent labor on the part of Mr. Pettit.

Among the tokens of public recognition of the value of its collections, the Society preserves the medals and diplomas awarded it at the Centennial Exhibition, Philadelphia, in 1876, the International Fisheries Exhibition in 1883, and the Colonial and Indian Exhibition in 1886.

The library of the Society now numbers 1,100 volumes. Among them are such costly works as the Challenger Reports, 20 vols.; Smith's Collection of Abbott's Illustrations, 2 vols. 1797; Drury's Exotic Entomology, 3 vols.; Stephen's Entomology, 8 vols.; Kirby's Entomology, 4 vols.; Say's Entomology, 2 vols.; Edwards' Butterflies of North America, 2 vols.; Scudder's Butterflies of New England, 3 vols.; McCook's American Spiders, 2 vols.; Packard's Monograph of Geometrid Moths; Lord Walsingham's Illustrations of Typical North American Tortricidæ, 2 vols.; The American Naturalist, 20 vols.; Scudder's Fossil Insects, 2 vols., etc. It is being continually enriched by the printed reports and periodicals from the principal Entomological societies of Great Britain, Australia, Austria, France, Germany, India, Italy, Russia, Switzerland, South America and the United States of America.

The Society's collections, library, electrotypes, etc., are insured for $3,500.

The Society reports, through its president, the unwelcome re-appearance of the Hessian fly (*Cecidomyia destructor*, Say), and recapitulates the best methods of dealing with this pest.

Another intruder that has been brought under the notice of the Society is the grain Aphis (*Siphonophora avenæ*, Fab.), which has appeared in many localities in Ontario.

The Larch saw-fly (*Nematus Erichsonii*, Hartig.), after doing incalculable harm to the tamarack forests of Canada, is now diminishing in numbers. A new importation allied to this (*Nematus pallidiventris*, Fallen) has made its appearance on willows brought from Russia by the late Mr. Charles Gibb.

The Mediterranean Flour Moth (*Ephestia Kuhniella*, Zeller) whose appearance two years ago in a large milling establishment in Ontario, caused so much consternation, and called forth such vigorous action on the part of the Ontario Agricultural Department seems happily to have been stamped out.

In these days of rapid transit and intercourse with foreign countries, the advent of new insect pests may be looked for. According to a wise provision the directors of the Society must be representatives from the different Agricultural sections of Ontario. By this arrangement it is hoped the appearance and operations of injurious iesects in any part of Ontario will be speedily made known to the Society, and receive careful attention.

The Society has noted with the greatest satisfaction the valuable work done by Mr. Fletcher, the Dominion Entomologist at Ottawa, who, by his entomological publications and his public addresses in various parts of the country, is diffusing knowledge that will be of the utmost importance to the community. The president of the Society has truly said that "the result of his work must in course of time be the saving of hundreds of thousands of dollars to the farmers and fruit-growers of the Dominion." (President's address, 21st annual report, p. 10).

A paper by Mr. H. H. Lyman, of Montreal, on "Pamphila Manitoba, Scudder, and its varieties," was read by the President, in the absence of the writer.

Various matters of interest were then brought up and discussed by the members present. Among them may be mentioned a consideration of the prevalence of the destructive Locust (or Grass-hopper) in some of the North-western States, and the probabilities of a further attack next year. The successful use of "Hopper-dozers" was mentioned, and much credit was given to Mr. Lawrence Bruner for his valuable investigations. The occurrence of an imported species of Saw-fly on the European alder was noted; and mention was made of the destruction of Hawthorns *(Crataegus)* by the beetle *Anthonomus quadrigibbus.*

Mr. Fletcher exhibited a specimen of *Vanessa Californica*, taken by Mr. W. H. Danby on Vancouver Island, September 20th, 1890, being the first recorded capture o this butterfly in Canada. He also exhibited (1) a very rare and extraordinary beetle, taken by Prof. John Macoun, in 1887, at Victoria, B C.; it is a large longicorn, but with its short wing-covers looks more like a rove beetle (*Staphylinid*); its name is *Ulochaetes leoninus*: (2) a specimen of the mole-cricket (*Gryllotalpa borealis*), which was taken at Leamington, in the County of Essex, by Mr. W. W. Hilborn, and gave an account of its curious and interesting habits: (3) a specimen of the pupa of *Chrysophanus thoe*, which he had raised from the egg; he procured from a pair of the butterflies in captivity twenty-four eggs, of which one hatched and went through all its larval stages to the pupa, feeding on dock (*Rumex*); the remaining eggs will evidently remain dormant till next spring: (4) a specimen of the cut-worm *Agrotis ochrogaster*, Guen, which is so injurious in the North-West, and compared it with *A. turris*, Grote; he stated that all grades of variation between the two forms had been obtained from one brood of the caterpillars, and that it was now accepted that they were all of one species, which should be known by the former name.

Mr. Fyles exhibited specimens of (1) *Colias interior* and *C. philodice*, var. *Laurentina*; (2) *Lycaena Couperi*, taken at Brantford, Ontario, regarding the identity of which with the southern form, *L. Lygdamus*, a discussion took place, leading to the conclusion that they were local forms of the same butterfly: (3) a "hair-snake," (*Gordius*), ten inches long, taken from the body of the larva of an *Acronycta*, which was remarkable, as these creatures are usually found infesting grass-hoppers and crickets of the order Orthoptera.

The meeting adjourned at 5.30 p. m.

EVENING SESSION.

In the evening the Society held a public meeting in its rooms at Victoria Hall which was largely attended by members and other friends from London and the neighbourhood, amongst whom the following were noticed:

Mr. James Fletcher (Vice President), and Mr. W. H. Harrington, of Ottawa; Rev. T. W. Fyles, of South Quebec; Captain G. Geddes, of Toronto; Messrs. J. M. Denton, W. E.

Saunders, J. Alston Moffatt, Rev. W. M. Rogers, Dr. Woolverton, Dr. Wilson. Prof. J. H. Bowman, J. Dearness, H. Stevenson, W. Stevenson, D. Arnott, W. Foote, W. Scarrow, and — Ware, of London.

The Rev. Dr. Bethune, Warden of Trinity College School, Port Hope, President of the Society, took the chair at 8 o'clock.

The annual report of the Council was read, and upon motion by Rev. T. W. Fyles, seconded by Prof. Bowman, it was adopted and referred to the Editing Committee for publication.

REPORT OF THE COUNCIL.

The Council of the Entomological Society of Ontario beg to present the following report of their proceedings during the past year :—

They are happy to be able to congratulate the members of the Society upon the large increase in numbers during the past year, and the continued interest that is taken in its various departments of work.

The Twenty-First Annual Report on Economic and General Entomology was sent to the Minister of Agriculture in December last, and was printed and distributed in the following April. It consisted of 105 pages, illustrated with 47 wood cuts, and contained many useful and valuable papers.

The *Canadian Entomologist* has been regularly issued at the beginning of each month ; the December number, which will complete the twenty-third volume, is now passing through the press. It is now the oldest publication of the kind in North America, and continues to maintain a high reputation among scientific entomologists, both from the value and interest of its papers and the eminence of many of its contributors. The number of pages has been much increased in the current volume. Nearly every issue has contained from 20 to 24 pages, and that for November extended to no less than 34. The whole volume will consist of over 280 pages, being more than forty in excess of the usual number.

Over one hundred volumes have been added to the library during the past year, including a handsome gift of 38 volumes from the President. Among the purchases may be mentioned the valuable work, by Mr. S. H. Scudder, on the Fossil Insects of North America, in two volumes, quarto.

A large and valuable addition to the cabinet of the Society has been made by the purchase of Mr. J. A. Moffatt's collection of *Lepidoptera.*

The following sections of the Society have been in active operation during the past year, viz.: The Botanical, Geological, Microscopical, and Ornithological. The reports of their proceedings are submitted herewith. It is gratifying to find that the formation of these sections has proved so successful and that it has led to an increase of our numbers and the performance of much valuable work. It is earnestly hoped that all persons interested in natural science, in London and the neighbourhood, will become members of the Society, and take part in the proceedings of one or more of the sections.

During the month of August important meetings were held at Washington, D.C. The Association of Economic Entomologists was presided over by our Vice-President, Mr. Fletcher, and was the most important, and the best attended, of any hitherto held in North America. A full account of its proceedings will be published in our annual report. At the meeting of the Entomological Club of the American Association for the Advancement of Science, Mr. Fletcher acted as our representative, and has given a report of the papers and discussions in the October and November numbers of the *Canadian Entomologist.*

The reports of the Montreal Branch, and of the Rev. T. W. Fyles, delegate to the Royal Society of Canada, are presented herewith. The accounts of the Treasurer, and the reports of the Librarian and Curator are also submitted.

The Council desire to express their satisfaction at the manner in which the Curator has discharged his duties during the past year, in the care and arrangement of the library and cabinets, and of the rooms of the Society.

All which is respectfully submitted.

CHARLES J. S. BETHUNE,
President.

ANNUAL ADDRESS OF THE PRESIDENT.

The President cordially welcomed all present and proceeded to deliver the annual address upon the chief topics of entomological interest which had taken place during the year.

Gentlemen.—I have much pleasure in welcoming you all to the annual meeting of our Entomological Society. I am sorry that we have been unable to hold it at an earlier and more favourable period of the year, and that we should thus be debarred from having an outing together, like that of our memorable field-day last year. I was unfortunately laid up with a severe illness during the latter part of the summer, and my colleagues thought that it would not be advisable to hold this meeting without your President; it was consequently postponed to this late date. Owing to my being confined to my room for so long a time, I can only give you a meagre account of the principal events of the year in the entomological world. In doing so let me first refer to the most noteworthy injuries caused by insects during the past season.

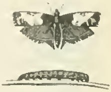


Fig. 1

The most serious insect pest of the year to the fruit grower in Canada was "the Eye-spotted bud moth," (*Tmetocera ocellana*, Schiff). This tiny insect (Fig. 1) has become very abundant of late and very widespread throughout the country. In Ontario, Quebec, New Brunswick and Nova Scotia it has been very injurious to the apple. The crop of fruit this year has been so unusually large that the loss occasioned by this insect has not, perhaps, been much noticed, but it is much to be feared that if it should be let alone to increase and multiply undisturbed, its ravages will become very serious and very conspicuous in the future. The object of attack, as the name of the insect indicates, is the opening bud of the apple; this is pierced by the young caterpillar, which forms a habitation for itself by drawing together portions of a dried and blackened leaf and lining them with silk to form a protecting case. As it grows larger, the worm often destroys a whole cluster of blossoms or of young fruit by drawing them together with silken threads and devouring the stems and foliage to such an extent that they wither and die. It occasionally also eats into the extremity of the twig from which the blossom proceeds, and by boring into it causes the destruction of the bloom and all hope of subsequent fruit. The caterpillar is of a dull brownish colour, with a few short hairs on its body proceeding from tiny warts. It usually becomes fully grown in June and forms its chrysalis in its larval case, from which the moth emerges in July. This is a pretty little creature, ashen gray in colour with a broad whitish band across the middle of the anterior wings. Its specific name is derived from the two little eye-like spots on each of these wings. A good deal may be done to check the spread of this insect by pulling off and crushing the clusters of withered leaves containing the caterpillars, but the best remedy is no doubt the spraying of the trees in early spring with a weak mixture of Paris green and water, not more than one quarter of a pound of the poison to fifty gallons of water, but it would be well to begin with a lower strength than this for fear of injuring the foliage of the trees.

Closely associated with the insect I have just referred to is "the Lesser Apple-leaf Folder" (*Teras minuta*, Robs), which has also been very abundant this year, (Fig. 2). The caterpillars of this insect appear in early spring and commence their depredations upon the tender foliage which has just come forth from the opening buds. They draw the opposite sides of the leaves together to form a habitation, and devour the foliage nearest to them. When they occur in large numbers they cause the trees to look as if they had been scorched by fire at the extremity of the branches. The moth is about a third of an inch long, with bright orange fore wings and silky white hind wings. There are two broods in the year, the first moth appearing early in spring and the later ones towards the end of July.

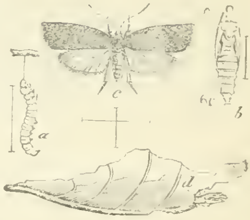


Fig. 2.

The larvæ of another and larger moth, "the Oblique-banded Leaf-roller," (*Cacœsia rosaceana*, Harris), have also been very numerous and destructive. This insect feeds upon a large variety of plants, both fruits and shrubs, but has been especially injurious to the apple during the past season. Like the two species already mentioned, it begins its attack in early spring by rolling up the young leaves of the plant and fastening them with silken threads. In the hollow cylinder thus formed the caterpillar (Fig. 3) takes up its abode, and when disturbed at one end quickly slips out at the other and lets itself down and away from the threatening danger by means of a silken thread. There are a great many species of leaf-rollers known to entomologists—they belong to the family of Tortrices and are well represented everywhere. Their habits are much the same in all cases, and when numerous they become a positive injury to the plants they attack. The moths may be at once recognized by their peculiar flat shape, resembling the outline of a bell when the wings are closed, (Fig 4) and having the outer margin of the fore wings wavy (Fig. 5.) In the species now referred to the fore wings are of a cinnamon or brown colour, and the hind ones a lighter yellow. The best remedy for this insect and the leaf-folder is the use of Paris green in the manner I have already described.

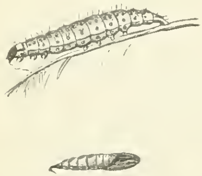


Fig. 3.

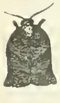


Fig. 4.

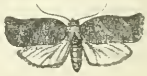


Fig. 5.

Canker-worms, the larvæ of the moths *Anisopteryx vernata*, Peck and *A. pometaria*, Harris, which are injurious almost every year in the Maritime Provinces, have this year been injuriously abundant in the eastern counties of Ontario, and have also been particularly destructive at Winnipeg, where they have in many cases stripped of their foliage the large trees of the ash-leafed maple which are there grown in the streets for shade. There are two classes of remedies for these insects. The object of one is to prevent the wingless female from climbing up the trees from the ground in order to lay their eggs after their emergence from the chrysalis state, which they pass in the earth. A common mode of doing this is to encircle the trunk of the tree a short distance above the ground with a band of cloth or thick paper, folded to a width of four or five inches and thickly smeared with tar or a mixture of tar and molasses. This should be applied to the tree in the autumn and kept on till the leaves are expanded in the following spring. The tar requires to be renewed from time to time, and should be looked to whenever any mild days occur at the beginning or close of winter. Tin and wooden troughs filled with oil have been used for the same purpose ; also collars of tin, sloping downwards like an inverted funnel have been found effective in preventing the female moths from ascending the trees. The other style of remedy is that directed against the caterpillars when they have gained possession of the trees, and consists of spraying the trees with Paris green or London-purple—a method that may be very properly described as a universal remedy for all foliage eating insects.

The irrepressible Cut-worm has made his unwelcome presence known in many parts of the country. In Alberta territory they were very numerous and destructive in the early part of the season. In reply to an appeal for instruction in the modes of dealing with this pest made by the editor of the Macleod *Gazette*, I sent him copies of our last report and Mr. Fletcher's bulletin containing directions upon the subject, and advised him strongly to have the poisoned traps used by the farmers in the neighbourhood. The remedies were duly published in the *Gazette* and I have no doubt were found very effective by those who tried them. The species of cut-worm in question is evidently *Agrotis ochrogaster*, Guen, which has also been found in abundance at Lethbridge. Its habit is to attack vegetation of every description, and thus it may be rated as one of our most destructive species. It is evidently very widely diffused throughout the Dominion, as it has been found in abundance at Cape Breton. In Manitoba another species, *Agrotis campestris*, Grote, has been most prevalent and injurious.

The insect producing the well-known injury called "silver-top" in grass (*Meromyza Americana*) was very abundant this year in many districts of Ontario. In most instances it was attended by its parsite (*Cœlinius meromyza*, Forbes), which may be relied upon to keep it in check eventually. In the meantime it will be wise for farmers to break up their old meadows, wherever "silver-top" has appeared, and put in a crop with plenty of manure.

The turnip flea-beetle, (*Phyllotreta vittata*, Fab.) is almost ubiquitous and always injurious. Sometimes it is so numerous on the plants that on the approach of a disturber it hops off from leaf to leaf with the pattering sound of fine rain or hail. This year it has been abundant in some localities and requires measures for its destruction. In this country, where it is not the practice to feed sheep upon the turnips in the field, it is quite safe to employ a mixture of Paris green and land-plaster in a proportion of one hundred times the quantity of the latter to that of the former. The best time to apply the poison is when the leaves of the plant are wet with dew.

Another "pestilent fellow" that requires constant watching is the pea-weevil (*Bruchus pisi*, Linn) (Fig. 6.) It appears, unhappily, to be on the increase in this Province. As large quantities of choice varieties of peas are grown in order to export the seed, it is a very important matter that they should be perfectly free from this pest. The first precaution to be taken is to make sure that the seed intended to be sown is free from the weevils; in fact, this is about the only thing that can be done owing to the habits of the insect and its working inside the pod. Should the seed be found to be infested with the weevils, the utmost care should be taken to kill them. There are several modes of doing this, but the most effectual is to place the seed in a perfectly tight vessel and to put on the top of the peas a saucer containing a little bisulphide of carbon—oue quarter of a pound is enough for three hundred weight of peas. This substance, when exposed to the air, becomes converted into a gas, which being heavier than the atmosphere, sinks down through the mass of peas and kills all living things exposed to it. It is necessary to exercise the utmost care in its use as it is highly inflammable and any light brought near it will cause an explosion. It is advisable, therefore, to put the peas to be treated into a barrel or other receptacle that can be moved out of doors before the cover is taken off.

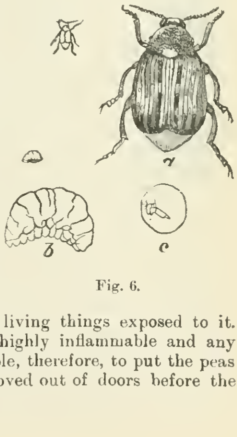


Fig. 6.

The next insect on my list of the troublesome is the striped cucumber beetle (*Diabrotica vittata*, Fab.), a little yellow-striped creature (Fig. 7) that is no doubt familiar to everyone. Dr. Weed, of the Ohio State Experiment Station, has satisfactorily shown by a series of careful experiments that the best mode of preventing injury from this insect is to so protect the plants that the beetle cannot get at them, and that this can be most cheaply and successfully done by "protecting each hill by a piece of plant-cloth, or cheese-cloth, about two feet square. This may be done simply by placing it over the plants and fastening the edges down by small stones or loose earth. It is better, however, to hold it up by means of a half barrel hoop, or a wire bent in the form of a croquet arch."

Fig. 7.

The Pear-tree slug (*Selandria cerasi*, Peck), Fig. 8, has been very abundant and injurious in many quarters, completely destroying the foliage of cherry as well as pear trees. It is too familiar a pest to require description at my hands. An effective remedy has been found in the application of a weak mixture of Paris green and water. Last year I referred to the exceeding abundance in all parts of this Province of the fall web-worm (*Hyphantria textor*, Harris). I regret to say that this year it has been more abundant than ever, so much so that it may be regarded as the most noticeable attack of the season. It has become widespread throughout Canada and the United States as far south, at least, as Virginia.

Fig. 8.

The larch saw-fly (*Nematus Erichsonii*) continues to be very abundant and destructive. Unfortunately it is a kind of attack for which there seems no practicable remedy.

The tent-caterpillars (*Clisiocampa*) have again, I am happy to say, been conspicuous by their absence. It is to be hoped that this immunity may long continue.

The oyster-shell bark-louse (*Mytilaspis pomorum*, Bouché), Fig. 9, has become very injurious in orchards and gardens, but few fruit-growers seem to realise how much injury it occasions, because it is so inconspicuous. Scraping the bark of the trunk and larger limbs, or scrubbing them with strong soapsuds will be found useful, but when the insect covers the smaller branches and twigs, as it soon does when undisturbed, it becomes necessary to resort to some other method of treatment. Syringing with a kerosene emulsion just before the buds burst in the spring, or late in the autumn immediately after the fall of the leaves, will be found most effective.

As far as I have been able to ascertain, these are the most noteworthy insect attacks of the year. There have been, no doubt, many others in particular localities, but these that I have referred to were for the most part widespread and general.

You will probably have noticed that I have given Paris green as the remedy for most insect pests. Its use has now been pretty thoroughly tested both here and in the United States, and there is no doubt that it is by far the simplest and most effective remedy for the codling-moth of the apple, the plum curculio, and all leaf-eating insects. It is, of course, absolutely necessary that great care should be exercised when handling so virulent a poison, to prevent injury to human beings or animals, and that the directions given by skilled entomologists, who have made careful experiments, should be strictly carried out. It must also be borne in mind that satisfactory results cannot be expected without the use of proper pumps and nozzles. The great point to be aimed at is to envelop the tree in a fine mist of the poisoned mixture, not to simply cause the foliage to drip from the squirting of a stream of the liquid. For full information regarding desirable appliances for this purpose and the quantities to be employed, I would refer those interested to the Bulletin No. 11, issued by the Central Experimental Farm at Ottawa, and prepared by Mr. Fletcher. It is entitled "Recommendations for the Prevention of Damage by some Common Insects of the Farm, the Orchard and the Garden." It is a most admirable little manual, and

Fig. 9.

contains within its thirty pages a wonderful amount of concise information regarding our commonest insect pests and the best way to deal with them. If any intelligent farmer or gardener will faithfully carry out the directions given, he will reap an abundant reward in the saving of a very large percentage of his crops or fruits, and he will at the same time gain a practical knowledge of insects that will stand him in good stead all the days of his life. If Mr. Fletcher had done no other work, and we all know how much valuable work he is always doing, the preparation of this little treatise would amply justify his appointment as Dominion Entomologist.

I hope that I have not wearied you with so much practical entomology to-night, but there is no doubt that our department of science is just now more concerned with economic rather than with technical investigations. An evidence of this may be found in the record of the proceedings of the meeting of economic entomologists held at Washington in August last, under the presidency of our colleague, Mr. Fletcher. It was a remarkable meeting, both as regards the number of distinguished scientists who were present, and the ability and usefulness which characterised the large number of papers read and the discussions that resulted from them. I trust that a full account will be published in our forthcoming annual report.

Since our last annual meeting many publications on economic entomology have been issued from the press, for the most part in the form of bulletins prepared by the entomologists attached to the Experiment Stations in various States of the Union. They are too numerous to mention in detail, but are always useful and interesting, and in many cases most valuable contributions to the knowledge of the subject. The Division of Entomology at Washington must not be overlooked when referring to work of this kind. Besides the publication of *Insect Life*, which is by far the best periodical of its kind that we have ever seen, many valuable papers on both scientific and practical entomology have been issued.

About ten years ago (in 1881) what was then called the United States Entomological Commission, consisting of Messrs. Riley, Packard and Thomas—three very eminent men—issued a work by Dr. Packard on "Insects Injurious to Forest and Shade Trees," (Bulletin No. 7), a goodly volume of 275 pages, well illustrated and replete with valuable information. Recently a revised and much enlarged edition of this work has been issued by the Department of Agriculture at Washington, bringing the original work more nearly down to date, and furnishing, as far as is possible, a complete manual on the subject. The new volume is more than three times the size of the former edition, consisting of no less than 950 pages, illustrated by over 300 wood-cuts and 40 plates, 12 of which are coloured. Some idea of the extent of the work, as well as of the importance of the subject, may be formed when I mention that descriptions are given of over 300 species of insects that affect the oak, and the names of nearly 150 more are mentioned; 61 are described as attacking the elm, and 30 more mentioned; 151 described that affect the pine, and a list of 20 more given; and so on for a large number of other trees. Economic entomologists for the most part devote their attention to the insects that attack fruit trees, crops and vegetables, as these most directly affect the public; but surely no more important matter can be studied than the preservation of our forests, which are annually being depleted for the purposes of commerce, as well as by fire and insects. It is high time that more attention was paid to this matter, and that people generally should be aroused to the dangers that will surely result if we allow our country to be stripped of its woods and forests. In some countries of Europe, notably in Germany, a very rigid oversight of the forests is maintained by the Government, and no wanton or careless destruction is permitted. In connection with this, they encourage scientific men to devote their studies to the insect enemies of the trees, and as a result some magnificent books have been published. Chief among these are the grand work of Ratzeburg, and the perhaps less widely-known publications of Kaltenbach. Along side of these Dr. Packard's book will assuredly take its place.

Miss E. A. Ormerod, we are happy to say, continues her valuable work in England with unceasing devotion and industry. It is gratifying to know that the difficulties which led to her resignation of the office of Consulting Entomologist to the Royal

Agricultural Society have been satisfactorily composed, and that the Society, having apologised for the action which led to her resignation, will now be able to count once more upon her invaluable assistance in all matters that relate to practical entomology. A very remarkable testimony to her ability and worth was afforded by the British press when the fact of her resignation was first made known. The leading agricultural journals and the newspapers, including the *Times*, spoke in warm terms of her merits and deprecated the action of the Society; social papers, such as the *Queen*, discussed the case and took up the cudgels in her defence; and all alike bore lively testimony to the inestimable value of her services.

Her sister, Miss Georgiana E. Ormerod, has recently published a series of colored diagrams of insects injurious to vegetation; they are 30 in number, and include all the most prevalent attacks upon crops, fruits and trees. They are beautifully executed and will be found most useful for the illustration of lectures to classes or addresses to farmers' institutes. Though intended for England, nearly all of them are equally applicable to this country.

In technical entomology the year has been marked by the publication of Mr. S. H. Scudder's grand work on Fossil Insects of the Tertiary Period. He has devoted to its preparation about a dozen years of patient toil, and it stands forth in conjunction with his marvellous volumes on "The Butterflies of the New England States and Canada," as a monument to his great ability, industry and learning. In this work he gives descriptions of no less than 612 species, for the most part collected in Colorado, Wyoming and British Columbia, with some from Pennsylvania, and Scarborough in this Province. Nearly all the species are beautifully figured on large lithographic plates.

Mr. W. H. Edwards continues to issue his work on "The Butterflies of North America," with its unsurpassed colored illustrations. The twelfth part of the third series is now announced as ready for distribution.

To turn for a few moments to our own affairs, I think I shall voice the feelings of you all when I say that we have much reason to congratulate ourselves on the progress and continued success of our Society, which is testified to in the reports of the council, and the treasurer and curator, which will presently be laid before you. It is well, however, for us all to remember that membership of a society carries with it the duty not only of paying the annual subscription to its funds, but also of giving some of our time and some of our work to furthering the special objects which it has in view. Much could no doubt be done by even the youngest and least skilled of our members by collecting specimens for our cabinets, making field observations on the habits of insects, or rearing them through their preparatory stages. Much remains to be learnt regarding the life history of many of our common butterflies, and there is still a boundless field to be surveyed among the moths and the other orders of insects. Short notes of original observations will always be of value and will be welcomed for publication by the editor of your journal, the *Canadian Entomologist*; he will also be pleased, especially at the present time, to receive contributions of an economic character for the pages of the annual report.

I beg to thank you, gentlemen, for your kind patience with me while I have attempted to lay before you those matters of entomological interest which have presented themselves to me during the past year. I am happy to feel that my somewhat meagre remarks will be well supplemented by those gentlemen who are to follow me with addresses to night.

Mr. Fletcher moved a vote of thanks to the President for his admirable and entertaining address, and in doing so spoke of the increasing interest amongst farmers in the practical application of economic entomology for the prevention of insect injury. The Eye-spotted bud-moth had been prevalent over a very large area in North America this year, extending through Canada from the Maritime provinces to western Ontario. There were still varying opinions as to the manner in which the insect passed the winter. The peculiar flattened eggs are laid in July, and Dr. Lintner had reared one almost to its full size before the end of August. Prof. Fernald stated that he had bred them and that they passed the winter amongst the fallen leaves. He himself had found larvæ in New

Brunswick which he considered belonged to this species, which were in a sort of cocoon in the crevices of the gnarled fruit spurs of apple trees. He hoped members would try and settle the question for their own locality, as the decision as to this point is of great importance in deciding what is the best remedy to apply. He had secured good results in treating this insect as well as the leaf-rollers and canker-worms on apples by spraying early with Paris green. With regard to Cut-worms (*Agrotis ochrogaster*) the red-bellied cutworm had been complained of also by many of his correspondents. Several specimens had been sent to him from Lethbridge, a large proportion of which had proved to be parasitized. At Ottawa the species had also been abundant, and from rearing a large number he felt sure that the red form known as *Ag. turris* and the pale *ochrogaster* were the same species. Mr. Fyles had at the meeting a pair representing both forms taken in copulation. A new turnip pest had appeared in the Northwest Territories in the shape of a handsome chrysomelid named *Entomoscelis adonidis.* Several consignments were sent in during August.

Mr. J. Dearness had much pleasure in seconding the vote of thanks He quite agreed with the mover in the practical value of such an address as the President had given them. Speaking of the pea weevil, Mr. Dearness had heard from farmers in the school districts he had visited that this pest was not so prevalent as last year. With regard to the Eye-spot bud-moth, he suggested spraying both the ground and the twigs during the winter. He mentioned having recently noticed a number of webs or tents on trees.

The President in acknowledging the vote of thanks explained that the tent caterpillars in the spring and the fall web-worms are two distinct insects, and that while the latter is very abundant, the former is scarce.

Mr. Denton had noticed that the Clisiocampa referred to by the President as being conspicuous by its absence in most parts of the Province during the past season, was unusually abundant in some orchards about London ; he had collected no less than 103 nests in an orchard of three acres.

Capt. Geddes had also noticed the insect to be abundant in the state of New Jersey

Mr. Denton referred to the injuries of the pea-weevil, and pointed out the importance of making its habits and life history known so that farmers should take the proper precautions against sowing infested seeds.

Mr. Fletcher said that frequently many of the beetles left the peas in the autumn and hibernated about barns and similar places, and therefore seed should be treated with bisulphide of carbon as soon after harvesting as possible. This substance is so inflammable and dangerous that it could not be recommended for general use by farmers, but most of the large seed dealers who handled peas had a special house built for treating their seed peas. This was especially the case in Prince Edward County.

REPORT OF THE BOTANICAL SECTION.

The report of the Botanical Section was then read by the Secretary and adopted, as follows :—

During the past year this section has held regular weekly meetings through the spring, summer and early autumn months, as well as occasional meetings during the winter. The proceedings of these meetings have been a source of great profit and pleasure to all the members.

Under the leadership of Mr. Dearness the primary instruction of a year ago gave place to earnest work of a more advanced order.

A collection of native plants was begun, and there are now in the herbarium over three hundred species, all neatly arranged in a cabinet provided by the parent society. The success that has attended our work in this particular has been largely due to the kindness of Mr. White, of Edmonton, and Mr. Morton, of Wingham, each of whom has furnished us with a large number of specimens ; also to Mr. Balkwill, whose untiring energy has enabled us to have the plants arranged in their present orderly condition. The object of the section is to establish a reference collection in London, by which botanists in Western Ontario may be enabled to identify specimens.

Among the botanical *finds* of the year are twenty species of Phanerogams—not heretofore reported from this locality—four of them (viz., Buchnera Americana, Physalis Grandiflora, Acerates Viridiflora, and Isopyrum Bi-ternatum) being new to the Canadian flora as reported before. Besides these a very large number of rare plants have been brought in and examined.

Of mosses, our leader has discovered two new to Canada, while in the fungi Mr. Dearness has been able to add upwards of seventy species to the American list.

A floral calendar was kept from the united observations of the members, which we expect to be a source of interest for comparison with those of succeeding years.

During the year there were several very interesting outings participated in by the members of the section, the principal points visited being within a radius of a few miles. Profs. Bowman and Dearness and several of the other members explored the botanic treasures of the drowned lands of Huron and Middlesex, and the vicinity of Port Franks. These fields afforded several of the most notable of the recent additions to our herbarium.

We hope that the work so begun will be more actively and systematically carried on in the year to come, and we believe that the spirit and energy of the younger and newer members afford us a guarantee that such will be the case.

M. W. Althouse,
Secretary Botanical Section.

After the reading of the botanical report, upon invitation by the President, Prof. Bowman also spoke of the work of the section and expressed the view that the establishment of the different sections had been of great service to the parent society, having interested many students who were not specially devoted to the study of insects *per se.* He spoke also of the good service done by Mr. Dearness in naming and exhibiting specimens of fungi at the various meetings.

Dr. Woolverton reported upon the work of the Geological section.

CAN INSECTS SURVIVE FREEZING?

The President read the following paper by Mr. H. H. Lyman, of Montreal :—

In a foot note to his paper on "The Butterflies of Laggan" (Can. Ent. XXII. 129), Mr. Bean says, "I hope none of my younger readers entertain the absurd mediæval superstition that hibernating caterpillars pass the winter in a *frozen condition.* In successful hibernation they do not get near to such a condition ; but if they do absolutely freeze, then are they undone caterpillars. Valkyria gives them sleep, unmixed with dreams, and they wake in Valhalla."

Without entering into any discussion as to my relative age in comparison with Mr. Bean's I may confess that I have long believed that some caterpillars as well as insects in other stages can and do survive freezing, and finding my belief so distinctly challenged, I have endeavoured to find some further light upon this subject from such literature as is accessible to me and from personal testimony. The first work to which I turned was Scudder's "Butterflies of New England."

In this work there is an Excursus, No. XVII, on "Lethargy in Caterpillars" and another, No. XXII., on "The Hibernation of Caterpillars," but in neither is any light thrown upon this question.

In the same author's "Butterflies" but little more is said upon this subject. On page 135, writing of Colias Philodice, he says "winter overtakes at once caterpillars of various ages, chrysalids and butterflies, and probably eggs. The experience of breeders, and the diversity in the time of appearance of the butterflies in the spring, render it probable that the cold season kills not only the butterflies and eggs, but perhaps the chrysalids as well, leaving the caterpillars to renew the life of the species in the spring." But though I have failed to gather from his works any information upon this subject I have learned from him personally and by letter some facts which may be thought to throw some light upon this question. About 35 years ago Mr. Scudder was prodding for beetles in some hole of a rotten stump in winter, at Williamstown, Mass., and came across several caterpillars of Isabella, and breaking at least one in two, found it brittle like an icicle and he believes he noticed crystals within, and therefore took two or three home to his room to see if they would come to life, which one or more did. Mr. Scudder, however, does not lay much weight on these facts and adds "I may or may not have broken more than one and do not at all remember whether only one or all came to life, but, of course, I *may* have broken only one and that one already dead."

I have recently seen somewhere, where I cannot now say, though I have spent hours in searching for the reference, an account of a caterpillar being found frozen into a cake of ice. The finder cut out a cube of the ice containing the caterpillar by means of a red hot poker, and then left the block on the sill outside his window for several days while the temperature ranged below zero. Upon bringing it into the house and thawing out the larva it revived and became quite active, but further experiment was prevented by its spinning its cocoon.

In Mr. Fletcher's report for 1889 (Experimental Farm Reports, 1889, p. 79) it is recorded that four larvæ of the Mediterranean Flour Moth (*Ephestia Kuhniella*, Zeller), were placed in a glass phial out of doors for half an hour when the temperature was only 5 degrees above zero F. and as a result were frozen hard so that they "rattled like glass beads against the sides of the bottle." Of the four, two never recovered at all, but the other two revived partially and retained their natural appearance for about a fortnight and moved their bodies a little though they finally succumbed. The Rev. T. W. Fyles has kindly given me the following particulars of his experience with larvæ of Coleoptera. "In the winter of 1864-5 I was splitting up decaying hemlock logs in my pasture at Iron Hill, P.Q., intending to burn them in the spring. On several occasions I found in these logs numbers of the larvæ of *Orthosoma unicolor* in a torpid state. In some cases the water had percolated into the burrows of the insects and frozen around their occupants. One day I picked out a number of the largest grubs from their icy envelopments and found them rigid and seemingly lifeless. I took them to my house and watched them as they slowly thawed into activity."

Dr. John Hamilton, of Allegheny, Pa., on the other hand, found, as related in his interesting paper in Can. Ent. XVII. 35, that he could not revive specimens of Coleoptera which were unquestionably frozen though some larvæ inclosed in cylinders of ice were still found to be flexible and regained activity on a rise of temperature. Though Dr. Hamilton's experience was decidedly against the theory that actual freezing does not necessarily cause death in insects he still admits that a good deal of evidence has been adduced on the other side and that records of the survival of frozen insects cannot be summarily dismissed.

To turn to some of the older writers on entomology I may quote the following from Kirby and Spence's "Introduction to Entomology," Vol. II., second edition. On page 231, after referring to some very extraordinary instances of the survival of insects under such trying circumstances as immersion in gin for 24 hours and immersion in boiling water, the authors say "Other insects are as remarkable for bearing any degree of cold. Some gnats that DeGeer observed, survived after the water in which they were was frozen into a solid mass of ice, and Reaumur relates many similar instances." Later on, pages 452-3 of the same volume, in treating of hibernation of insects, I find the following very interesting remarks: "But though many larvæ and pupæ are able to resist a great degree of cold, when it increases to a certain extent they yield to its intensity and become solid masses of ice. In this state we should think it impossible that they should ever revive. That an animal whose juices, muscles and whole body have been subjected to a process which splits bombshells and converted into an icy mass that may be snapped asunder like a piece of glass, should ever recover its vital powers, seems at first view little less than a miracle, and if the reviviscency of the wheel animal (*Vorticella rotatoria*) and of snails, etc., after years of desiccation had not made us familiar with similar prodigies, might have been pronounced impossible, and it is probable that many insects when thus frozen never do revive. Of the fact, however, as to several species, there is no doubt. It was first noticed by Lister, who relates that he had found caterpillars so frozen that when dropped into a glass they clinked like stones, which nevertheless revived. Reaumur, indeed, repeated this experiment without success, and found that when the larvæ of *Bombyx Pityocampa*, F. were frozen into ice by a cold of 15° R. below zero (2° F. below zero) they could not be made to revive. But other trials have fully confirmed Lister's observations. My friend, Mr. Stickney, the author of a valuable "Essay on the Grub" (larva of *Tipula oleracea*) to ascertain the effect of cold in destroying this insect, exposed some of them to a severe frost, which congealed them into perfect masses of ice. When broken, their whole interior was found to be frozen. Yet several of these resumed their active powers. Bonnet had precisely the same result with the pupæ of *Papilio brassicæ*, which, by exposing to a frost of 14° R. below zero (0° F.), became lumps of ice and yet produced butterflies. Indeed, the circumstance that animals of a much more complex organization than insects, namely, serpents and fishes, have been known to revive after being frozen is sufficient to dispel any doubts on this head" In Burmeister's "Manual of Entomology" the above instances are also referred to though at much less length, but as no additional facts are adduced it is unnecessary to quote from his work.

The above would seem sufficient to establish the proposition that some insects can survive freezing, and indeed when one remembers that insects successfully maintain their existence in the most arctic lands which have ever been visited by man, it seems strange that any one should ever have questioned it. Is it conceivable that these tiny creatures, when in a state of lethargy and partaking of no nourishment, could successfully resist yielding to frost in regions subject to a temperature of over 70° F. below zero, and when in summer the soil only thaws to the depth of 12 or 15 inches, the ground below this depth being perpetually frozen?

The meteorological tables of the English Arctic Expedition of 1875-6 show that the mean temperature of the winter months at the stations of the two vessels, *Alert* and *Discovery*, varied from 5° F. below zero in October and 17° F. below zero in April to 40° F. below zero in the middle of the winter, and that the minimum temperatures recorded were:—73¾° F. at the winter quarters of the first named vessel, and—70·8° F. at the station of the latter in Discovery Bay.

In spite of these terrible temperatures the naturalists attached to the expedition were very successful, and Mr. Robert McLachlan, F.R.S., to whom the collections of insects were submitted, wrote as follows in his report:

"The materials brought home from between the parallels 78° and 83° N. latitude, showed quite unexpected, and, in some respects, astonishing results. I have no hesitation in saying that the most valuable of all the zoological collections are those belonging to the entomological section, because these latter prove the existence of a comparatively rich insect fauna, and even of several species of showy butterflies, in very high latitudes."

But the most interesting account of experiments on this subject which I have seen, is that given by Commander James Ross, R.N., F.R.S., and inserted by Curtis in the Entomological Appendix to the "Narrative" of Sir John Ross's second arctic voyage. The experiments were tried upon the caterpillars of *Laria Rossii*, a very abundant species in Boothia Felix, and, doubtless, all through the arctic regions of this continent. The account (page lxxi.) is as follows :

"About thirty of the caterpillars were put into a box in the middle of September, and after being exposed to the severe winter temperature of the next three months, they were brought into a warm cabin, where, in less than two hours, every one of them returned to life, and continued for a whole day walking about. They were again exposed to the air at a temperature of about 40° below zero, and became immediately hard frozen ; in this state they remained a week, and on being brought again into the cabin, only twenty-three came to life. These were at the end of four hours put out once more into the air, and again hard frozen ; after another week they were brought in, when only eleven were restored to life. A fourth time they were exposed to the winter temperature, and only two returned to life on being again brought into the cabin. These two survived the winter, and in May an imperfect *Laria* was produced from one, and six flies from the other."

That a caterpillar infested with parasites should have been able to survive such severe treatment and spin its cocoon is most remarkable, and it is not to be wondered at that alternate freezing and thawing should have been disastrous to the majority of those experimented upon.

Many other similar accounts doubtless exist, but I think that the records which I have thus brought together are sufficient to prove that actual freezing is not necessarily fatal to insects, and that Mr. Bean had no sufficient warrant for the statement quoted at the beginning of this article.

Mr. DEARNESS was of the opinion that it was clearly the thawing not the freezing of plants which caused the injury.

Mr. FLETCHER asked him whether he did not think that the rupturing of cells and tissues by the crystallization and expansion of the contained liquids was the chief injury.

Mr. DEARNESS thought not, because if care were taken in thawing out frozen plants slowly many of them would sustain little injury. He recounted the experience of a friend who had endeavoured to get very early potatoes by planting them before the usual time. After they were well above the ground a severe frost occurred. He went out very early in the morning and watered a part of them with cold water ; these were all killed, whilst others under a fence were uninjured. He accounted for this from the fact that at the time he watered the plants the temperature of the air was below the freezing point, and as soon as the water fell upon the plants they were temporarily thawed out and then froze up again, and were scorched by the sun as soon as it fell upon them. Geranium slips, he said, could be buried beneath the surface of the ground and would receive no injury if the thawing were gradual.

Prof. BOWMAN thought that insects were better able to withstand freezing in some stages of their growth than in others. Dallinger had found in his investigations of bacteria, that a kind of bacterium which could, at a certain stage of its development, withstand the effect of boiling water, would at others be easily destroyed. He thought that the woolly covering of plants and insects, as well as the cocoons of the latter, were intended to protect them from the effects of too rapid changes of temperature.

Mr. HARRINGTON gave a most interesting account of a trip to Japan, which he illustrated with a number of beautiful and remarkable specimens.

Mr. Fletcher gave a very interesting account of a visit he made in August last to Mr. W. H. Edwards, the celebrated author of the great work on "The Butterflies of North America," who lives at Coalburgh, in West Virginia. He was especially interested in the methods of breeding butterflies through all their stages from the egg to the imago. Among many valuable points that he referred to, there may be mentioned that when eggs are placed in a glass bottle preparatory to hatching, it is best to use a tight plug of cotton batting rather than a cork ; when the insects hatch out they usually do not require any food for twenty-four hours ; it is best to have a plant of the required kind growing in a pot if possible, and transfer the young caterpillars to it, keeping the whole covered with gauze; a small plant may be kept under a glass lamp chimney with gauze pasted over the top; the larvæ will wander about if the plant is not the usual food-plant of the species, but they can usually be got to eat an allied plant of the same botanical genus. When the working table is covered with twenty or thirty breeding jars it is well to have a conspicuous coloured label for those that require frequent or regular attention. Bags for enclosing larvæ feeding on plants out-of-doors should be very neatly made, in order that there may be no corners for the insects to hide in. It is very important that the breeding-jars or cages should be kept scrupulously clean. Among the butterflies he saw at Coalburgh there may be especially mentioned *Argynnis Diana*, which was first found in the mountains near by; *Argynnis Cybele*, remarkable for the large size of the specimens; *Papilio Philenor*, *Debis Portlandia*, of which there are two broods in the year, etc. Single Zinnias were found to be most attractive to butterflies of all kinds, and should be freely planted in the collector's garden.

The next paper on the list was read by the Rev. T. W. Fyles on *Nematus Erichsonii*, the larch saw-fly, which has become so excessively destructive in the lower Province during the last few years.

The meeting adjourned at 10.45 p.m.

THURSDAY MORNING.

The Society met again in their rooms at 10.15 a.m. An interesting letter was read by Mr. Fletcher from Mr. Edmund Baynes Reid, who is now in charge of the Government Meteorological Station at Esquimalt, British Columbia.

Capt. Geddes read a paper on his recent visit to Germany and the entomologists whom he had met there.

Mr. Harrington described a method of packing beetles and other insects for transportation in rolls of paper, which he had found very simple and effective. Mr. Fletcher mentioned the capture at Ottawa of the rare Southern moth, *Erebus odora*. Mr. Fyles read a paper on the larvæ of *Gelechia gallæ-diplopappi* and a parasite which he had procured from it, and exhibited coloured drawings in illustration. The paper will be published in the *Canadian Entomologist*. Mr. Harrington said that the parasite was evidently, as Mr. Fyles said, a *Bracon*, but that the genus was a difficult one, and it was hard to say whether it was a new species or not.

Capt. Geddes exhibited a specimen of *Melitæa Carlota* taken at Scarborough, near Toronto. Mr. Fletcher exhibited a specimen of *Pyrgus centaureæ*, taken at Wabigon tank on the Canadian Pacific Railway, by Mr. W. McInnes, of the Geological survey, and one of *P. cæspitalis*, which resembles it very closely, from British Columbia, where it is not uncommon.

Mr. Moffatt read a letter from Miss Emily Morton, of Newburgh, N.Y., in which she described her experiences in rearing hybrids of the large Emperor moths, some of which remained for twenty-three months in their cocoons, and related her chief captures during the season, especially referring to her success in collecting at willow catkins last April.

Mr. Moffatt also read his paper on the results of his examination under the microscope of an unexpanded wing of *Callosamia promethea*.

Mr. Fletcher drew the attention of the meeting to specimens which he exhibited of (1) *Argytes longulus*, Lec., a rare Sylphid taken on Vancouver Island by Prof. John Macoun in 1887; (2) *Entomoscelis adonides*, a showy red and black chrysomelid which has occurred as a pest to turnips and cabbages in the Northwest territories during the past season; (3) *Acronycta funeralis*, bred from white birch at Ottawa; (4) *Gortyna cataphracta*, which is a troublesome pest in gardens, boring into the stems of tomatoes, lilies, and raspberries; and a single specimen which had entered the stem of a grass, *Elymus Canadensis*; (5) *Myrmeleon abdominalis*, bred from larvæ collected near Indianapolis, Indiana, and exhibited at the last annual meeting.

The meeting, which was throughout very enjoyable and successful, then adjourned.

NOTE ON LIFE AREAS.

With regard to the distribution of birds, ornithologists have hitherto accepted as approximately correct the faunal areas as defined by Prof. J. A. Allen, of New York. By him the breeding areas of certain birds were considered to fall within the limits of one or more of these faunæ. For instance the Slate-colored Junco (*Junco hyemalis*) was held, during the period of reproduction, to be limited in its southward dispersion by the Canadian fauna; the Wood Thrush (*Turdus mustelinus*) by the Alleghanian, and the Cerulean Warbler (*Dendroisca cœrulea*) by the Carolinian.

The mean summer temperature being considered the most important factor in determining these divisions, latitude had less to do with the question than altitude. For instance, mountain tops in low latitudes were correctly held to be isolated portions of the Arctic fauna. But Middlesex is uniform in its physical features, and yet representatives of the three faunæ given above have been found breeding in the county under almost identical climatic conditions. Deep, cool swamps occur, which may account in part for the presence of the more northern species, but on the whole there is such an abnormal admixture of birds usually found in summer so far apart as to throw doubts on the feasibility of maintaining such divisions. It is probable that the researches of Prof. Merriam, Ornithologist for the Department of Agriculture at Washington, who has lately given much attention to the problem of distribution, will prove that there are but two life provinces in North America, viz:—The Boreal (Northern), and the Sonoran (Southern) according as the forms of life inhabiting each have reached this continent from the north or south When the limits of these two great divisions are mapped out it will likely be found that Middlesex occupies a neutral position, being on the whole Sonoran rather than Boreal, but with a strong tinge of the latter.

LIST OF BIRDS KNOWN TO BREED IN MIDDLESEX COUNTY, ONTARIO.

BY THE LONDON ORNITHOLOGICAL SECTION OF THE ENTOMOLOGICAL SOCIETY.

Those birds which are decidedly and directly beneficial on account of their feeding habits are marked (*a*). Those which are neutral or nearly so are marked (*b*). Those which are open to doubt as being possibly injurious are marked (*c*).

(*b*) AIX SPONSA—*Wood Duck.*—Residents around the pond at Dorchester say it bred there up to about five years ago.

(*b*) BOTANRUS LENTIGINOSUS—*Bittern*—A nest of unfledged young found on the flats at Arva in 1889, by W. A. Balkwill.

(*b*) ARDEA HERODIAS—*Great Blue Heron*—A few heronries containing sometimes as many as several hundred nests are known in the county, though they are becoming gradually deserted. Occasionally single nests are found in high deciduous woods.

(*b*) ARDEA VIRESCENS—*Green Heron*—One nest found within two miles of the city in 1888 by W. A. Balkwill. Pairs are believed to breed in other parts of the county, having been seen regularly in summer.

(*b*) PHILOHELA MINOR—*American Woodcock*—Not very common.

(*b*) ACTITIS MACULARIUS—*Spotted Sandpiper*—Breeds commonly in fields and waste places near water.

(*a*) ÆGIALITIS VOCIFERA—*Kildeer Plover*—Not very common, perhaps one pair to a square mile.

(*b*) COLINUS VIRGINIANUS—*Bob-white*—Abundant in the west and south, but quite rare in the north-east of the county.

(*b*) Bonasa umbellus—*Ruffed Grouse*—Common in most large or thick woods at a reasonable distance from the towns.

(*b*) Meleagris gallopavo—*Wild Turkey*—Formerly quite common. A nest was found in Delaware Township in 1878 with thirteen eggs.

(*b*) Zenaidura macroura—*Mourning Dove*—Not as common in Middlesex as it is farther west in the peninsula.

(*a*) Cathartes aura—*Turkey Vulture*—A nest was found in 1890 by J. N. Sullivan near Kerwood. Several other pairs probably breed in the county.

(*a*) Circus hudsonius—*Marsh Hawk*—Breeds in almost all large sphagnum swamps, also in fields occasionally ; one nest found in London South in June, 1890.

(*c*) Accipiter velox—*Sharp-shinned Hawk*—Three nests only are recorded ; not many pairs spend the summer here.

(*c*) Accipiter cooperi—*Cooper's Hawk*—Breeds sparingly.

(*a*) Buteo borealis—*Red-tailed Hawk*—Tolerably common.

(*a*) Buteo lineatus—*Red-tailed Hawk*—Our most common hawk in the breeding season.

(*a*) Falco sparverius—*American Sparrow Hawk*—Rather rare. Probably not more than one pair in three or four square miles.

(*a*) Asio wilsonianus—*American Long-eared Owl*—Only one nest found, by R. Elliott near Plover Mills.

(*a*) Megascops asio—*Screech Owl*—Not uncommon, though nests are not often found. One by W. A. Balkwill near London in 1890, and 1891 in the same hole.

(*a*) Bubo virginianus—*Great Horned Owl*—Tolerably common.

(*a*) Coccyzus americanus—*Yellow-billed Cuckoo*—More common than the next, laying smaller sets of larger eggs. Believed to have increased in abundance during the last ten years.

(*a*) Coccyzus erythrophthalmus—*Black-billed Cuckoo*—Contrary to its custom elsewhere, nests have been found with six eggs. Sets of this size in other parts of the country have generally been reported as being partly hatched, the eggs being laid at considerable intervals so that the first eggs are hatched before the last are laid.

(*b*) Ceryle alcyon—*Kingfisher*—Common.

(*a*) Dryobates villosus—*Hairy Woodpecker*—Rather rare; nests usually escape detection until the young are hatched.

(*a*) Dryobates pubescens—*Downy Woodpecker*—More common than the last.

(*a*) Sphyrapicus varius—*Yellow-bellied Woodpecker*—Rare.

(*a*) Ceophlœus pileatus—*Pileated Woodpecker*—Very rare.

(*a*) Melanerpes erythrocephalus—*Red-headed Woodpecker*—Common.

(*a*) Melanerpes carolinus—*Red-bellied Woodpecker*—Very rare.

(*a*) Colaptes auratus—*Flicker*—Common. Holes made by this species and by the Red-head are occasionally found so close to the ground that the eggs are almost on the ground level.

(*a*) Antrostomus vociferus—*Whip-poor-will*—Tolerably common in suitable localities. Appears to be less common this year than formerly.

(*a*) Chordeiles virginianus—*Night Hawk*—Common.

(*a*) Chaetura pelagica—*Swift*—Common. Still breeds in trees occasionally.

(*a*) Trochilus colubris—*Ruby-throated Hummingbird*—Rather rare.

(*a*) Tyrannus tyrannus—*Kingbird*—Common.

(*a*) Myiarchus crinitus—*Crested Flycatcher*—Tolerably common.

(*a*) Sayornis phœbe—*Phœbe*—Common. Most suitable bridges contain one pair, and nests are also built in the upturned roots of trees in the woods.

(*a*) Contopus virens—*Wood Pewee*—Common.

(*a*) Empidonax minimus—*Least Flycatcher*—Common.

(*a*) Otocoris alpestris praticola—*Prairie Horned Lark*—Common.

(*c*) Cyanocitta cristata—*Blue Jay*—Tolerably common.

(*c*) Corvis americanus—*Crow*—Common.

(*a*) Dolichonyx oryzivorus—*Bobolink*—Common.

(*c*) Molothrus ater—*Cowbird*—Very Common.

(*a*) Agelaius phœniceus—*Red-winged Blackbird*—Common.

(*a*) Sturnella magna—*Meadow Lark*—Common.

(*a*) Icterus galbula—*Baltimore Oriole*—Common.

(*c*) Quiscalus quiscala æneus—*Bronzed Grackle*—Common.

(*c*) Carpodacus purpureus—*Purple Finch*—Uncommon.

(*b*) Acanthis linaria—*Redpoll*—A single nest found near Hyde Park by J. A. Morden in 1879. Birds not seen, but eggs identified by comparison with European specimens from the same species.

(*a*) Spinus tristis—*American Goldfinch*—Common—Spotted eggs have been found on rare occasions.

(*a*) Poocætes gramineus—*Vesper Sparrow*—Very Common.

(*a*) Ammodramus sandwichensis savanna—*Savanna Sparrow*—Common.

(*a*) Chondestes grammacus—*Lark Finch*—Rare. A single nest found in 1890 a few miles west of the city.

(*a*) Spizella socialis—*Chipping Sparrow*—Common.

(*a*) Spizella pusilla—*Field Sparrow*—Common in certain localities.

(*a*) Junco hyemalis—*Slote-colored Junco*—Common in certain localities, particularly so in the north-eastern part of the country.

(*a*) Melospiza fasciata—*Song Sparrow*—Very common.

(*a*) Melospiza georgiana—*Swamp Sparrow*—Common in marshy places, but only one nest found, by R. Elliott.

(*a*) Pipilo erythrophthalmus—*Towhee*—Common.

(*a*) Habia ludoviciana—*Rose-breasted Grosbeak*—Appears to be less common than formerly.

(*a*) Passerina cyanea—*Indigo Bunting*—Tolerably common.

(*a*) Piranga erythromelas—*Scarlet Tanager*—Tolerably common.

(*a*) Progne subis—*Purple Martin*—Much less common than formerly. This species has suffered by the pre-occupation of its breeding places by the English sparrow.

(*a*) Petrochelidon lunifrons—*Cliff Swallow*—Less common than formerly, owing to the same cause, somewhat, as the former species.

(*a*) Chelidon erythrogaster—*Barn Swallow*—Common.

(*a*) Tachycineta bicolor—*Tree Swallow*—Tolerably common.

(*a*) Clivicola riparia—*Bank Swallow*—Common in suitable localities, although not so common as formerly.

(*a*) Stelgidopteryx serripennis—*Rough-winged Swallow*—Uncommon.

(*a*) Ampelis cedrorum—*Cedar Waxwing*—Tolerably common.

(*a*) Lanius ludovicianus excubitorides—*White-rumped Shrike*—Rare.

(*a*) Vireo olivaceus—*Red-eyed Vireo*—Common.

(*a*) " gilvus—*Warbling Vireo*—Rather common.

(*a*) " flavifrons—*Yellow-throated Vireo*—Rare.

(*a*) Miniotilta varia—*Black and White Warbler*—Common in deep woods, but only one nest found, by W. E. Saunders in May, 1881.

(*a*) Helminthophila chrysoptera—*Golden-winged Warbler*—Rather rare.

(*a*) " ruficapilla—*Nashville Warbler*—Limited to a few localities; a single nest found by Wm. Saunders near London in 1882.

(*a*) Dendroica æstiva—*Yellow Warbler*—Common.

(*a*) " pennsylvanicus—*Chestnut-sided Warbler*—Tolerably common.

(*a*) Seiurus aurocapillus—*Ovenbird*—Tolerably common.

(*a*) " noveboracencis—*Water Thrush*—Rather rare.

(*a*) Geothlypis trichas—*Maryland Yellow Throat*—Common in suitable localities.

(*a*) Sylvania canadensis—*Canadian Warbler*—Rather common. Partially fledged young found in several localities near London.

(*a*) Setophaga ruticilla—*Redstart*—Common.

(*a*) Galeoscoptes carolinensis—*Catbird*—Common.

(*a*) Harporhynchus rufus—*Brown Thrasher*—Locally common.

(*a*) Troglodytes aedon—*House Wren*—Common.

(*a*) Troglodytes hiemalis—*Winter Wren*—A single nest found with one egg; not uncommon in deep cedar-swamps.

(*a*) Certhia familiaris americana—*Brown Creeper*—Rare. A nest of young found nine miles from London in June, 1880.

(*a*) Sitta carolinensis—*White-breasted Nuthatch*—Not very common.

(*a*) Parus atricapillus—*Black-capped Chickadee*—Not common.

(*a*) Polioptila cerulea—*Blue-gray Gnatcatcher*—Tolerably common.

(*a*) Turdus mustelinus—*Wood Thrush*—Tolerably common.

(*a*) " fuscescens—*Wilson's Thrush*—Common.

(*a*) Merula migratoria—*Robin*—Abundant.

(*a*) Sialia sialis—*Blue Bird*—Common. A few sets of white eggs have been found.

Supplementary List—No. 1.

Birds which have probably bred in greater or less numbers in the past, but have now become so rare that it is unlikely that their nests will be found:

(*b*) Lophodytes cucullatus—*Hooded Merganser*.

(*b*) Ectopistes migratorius—*Passenger Pigeon*.

Supplementary List—No. 2.

Birds which are observed in summer and are likely to be found breeding as the fauna is better worked up:

(*a*) Rallus virginianus—*Virginia Rail*.
(*a*) Porzana carolina—*Carolina Rail*.
(*a*) Gallinula galeata—*Florida Gallinule*.
} Will probably be found in some of our larger marshes.

(*a*) Syrnium nebulosum—*Barred Owl*—Scarce resident.

(*a*) Nyctala acadica—*Saw-whet Owl*—Young have been taken near St. Thomas, in Elgin County, in July.

(*a*) Empidonax pusillus traillii—*Traill's Flycatcher*—Frequently observed in May and June.

(*a*) Contopus borealis—*Olive-sided Flycatcher*—One observed June 2nd, 1891. Common summer resident in Bruce County.

(*a*) Icterus spurius—*Orchard Oriole*—Common in parts of adjoining counties, and observed every spring.

(*a*) Zonotrichia albicollis—*White-throated Sparrow*—Observed at different points in summer.

(*a*) Dendroica caerulescens—*Black-throated Blue Warbler.*
(*a*) " caerulea—*Blue Warbler.*
(*a*) " blackburniæ—*Blackburnian Warbler.*
(*a*) " virens—*Black-throated Green Warbler.*
(*a*) " vigorsii—*Pine Warbler.*
(*a*) Geothlypis philadelphia—*Mourning Warbler.*
Frequently observed in May, June, and July.

(*a*) Cistothorus palustris—*Long-billed Marsh Wren*—Nests will likely be found in some of our larger marshes.

(*a*) Regulus satrapa—*Golden Crowned Kinglet*—Has been observed twice in June in the spruce swamp near London.

(*a*) Turdus aonalashkae pallasii—*Hermit Thrush*—Heard singing in June in cedar swamps.

PAMPHILA MANITOBA (SCUD.) AND ITS VARIETIES.

BY H. H. LYMAN, MONTREAL.

In 1874, Mr. Scudder published his paper on "The Species of the Lepidopterous Genus Pamphila," in the Memoirs of the Boston Society of Natural History, in which the following species were described as new: Nevada, Colorado and Manitoba; and Sassacus, Ottoe, Juba, Comma of Europe, and Sylvanoides were also treated of.

None of the descriptions are detailed, but are altogether comparative pointing out the differences between the closely allied forms, and in the case of Manitoba, the comparisons instituted are exclusively with the European Comma. The four specimens (two males and two females illustrated) are all from the west of the continent, or rather, I should say, from the west and centre. One specimen was from Lake Winnipeg, one from Colorado, and two from British Columbia. The figures show specimens of which the underside of secondaries is dark greenish or greenish brown, and with considerable variation in the prominence or restriction of the markings.

Though no figure of any eastern specimen is given, it is stated in the text that the species had been taken at Riviere du Loup by Mr. Couper.

Since then it has been repeatedly taken on the Lower St. Lawrence by other collectors at Cacouna and Riviere du Loup, Metis, and even as far as Gaspe by myself, in 1888.

The form found on the Lower St. Lawrence is very uniform in colour and has the outer third of the underside of the fore wings and the whole of the underside of the hind wings, with the exception of the inner margin and hind angle, of dark brown colour, though occasionally with a slightly greenish tinge.

In 1890, on returning east from a trip over the Canadian Pacific Railway, I stopped for a day at Regina, the date of my visit being Aug. 5th, and as usual devoted a good part of the day to collecting lepidoptera. Among other things I collected a good series of males of a Pamphila of the Manitoba group which was new to me, but only succeeded in securing one female, it apparently being a little early for that sex. During October of that year I paid a flying visit to New York and Boston taking a few specimens with me for comparison, among them a specimen of this skipper which I showed to Mr. Henry Edwards, who said that he did not know it and thought it must be new. Mr. Scudder said it might be new, but one needed a very full series in that group. I afterwards showed it to Mr. Fletcher and asked him if he had ever seen that form and he immediately said "Yes, at Regina." He added that he had sent a specimen to Dr. Henry Skinner who had pronounced it to be only Manitoba, but Mr. Fletcher expressed to me the opinion that it was at least a very distinct variety. The point in which this form chiefly differs from Manitoba of the Lower St. Lawrence is that those parts on the underside which are brown in the latter are of a very pale greenish yellow or yellowish green in the Regina form, but it also differs somewhat above in that the males are usually of a yellower tone while the brown of the female is decidedly darker and the spots of the fore wing decidedly lighter, some of them being almost white, than in the eastern specimens.

Wishing to get further light upon the probable relationship of these forms, I this year took a number of specimens of each with me on a trip to Boston and New York before returning home from a short holiday on the Atlantic coast, and through the kindness of Mr. Scudder was enabled to examine his original types of Manitoba. One of these agreed exactly with my specimens from the Lower St. Lawrence, while the ones from British Columbia and Colorado were greener, but none agreed with, or even approached the average of the Regina specimens. Mr. Scudder, however, on account of the close similarity of the markings seemed to be of opinion that the Regina form must be a variety of Manitoba. At New York Mr. Neumoegen kindly allowed me to compare my specimens carefully with the Pamphilas in his magnificent collection, but no specimen was found which at all agreed with the Regina form, and Mr. Neumoegen expressed the opinion that I would be safe in describing it. But in order to guard against all danger of being accused of rashness I took the specimens out to New Brunswick, N. J., to Prof. J. B. Smith, who very kindly at my request dissected the male abdominal appendages of one of the Regina specimens, which upon examination were seen to be practically identical with the illustrations of those of Manitoba drawn by the late Mr. Edward Burgess and published by Mr. Scudder. The form would therefore seem to be only a variety of Manitoba, but Prof. Smith expressed the opinion that it might very properly receive a varietal name as a distinct geographical race. Mr. Scudder, however, in his "Butterflies of New England" would seem to have adopted this form as a basis of his description of Manitoba, as he describes the underside of the hind wings as being, except for the markings, "almost uniformly greenish yellow," although he has no specimen of the Regina form in his collection.

I am, however, strongly of opinion that the difference between the eastern specimens and these from Regina is sufficiently great to be worthy of being indicated by varietal names, and if the name Manitoba is to be restricted to the dark brown or greenish brown specimens, as I believe it was originally applied, I would suggest the name, var. Assiniboia, for the light greenish-yellow Regina form. If, however it is preferred to call the latter Manitoba I should suggest the name, var. Laurentina, for the dark brown form of the Lower St Lawrence.

NEMATUS ERICHSONII: A RETROSPECT.

BY REV. THOMAS W. FYLES, SOUTH QUEBEC.

The fecundity and voracity of this species must have arrested the attention of foresters and entomologists at a very early date after its introduction to America. It is believed to have been brought over on *Larix Europæa*, and its operations were first noticed in 1880, by Professor C. S. Sargent, Director of the Arnold Arboretum at Brookline, Massachusetts.* In 1881 and 1882 it came under the notice of Dr. Packard in the State of Maine; and in 1883 I observed it in vast numbers in the border townships of Bury and Lingwick in the Province of Quebec, and drew the attention of the Entomological Society of Ontario to the fact. Early in the summer of the following year I witnessed a flight of the perfect insects at Quebec, and gathered a number of the exhausted flies from the decks of the ferry-boats plying between Levis and that city. In that same year the tamaracks around my residence were completely defoliated by the larvæ. It was impossible to approach the trees with comfort. The creatures were crawling everywhere around; and the sound produced by the droppings of their excrementa upon the undergrowth was like an incessant pattering of rain-drops. By this time their ravages had been traced through the length of eastern Canada and into the maritime Provinces.

It was at first thought that the tamarack would survive the assaults of the Nematus—the more because a second growth of verdure appeared on the trees after the larvæ had left them. So eminent an observer as Dr. Packard was inclined to this opinion;† but Professor Riley seems to have had a clearer view of the consequences of the insect's attacks ‡

Many entomologists watched the Nematus through its metamorphoses hoping to discover parasitic foes of the insect. I have not learned that any were successful. The European parasites of the species (if such there were) did not appear; and our native Hymenoptera parasitica had not, it would seem, acquired a taste for the immigrant. Predacious insects, ants,§ and ground beetles, || were found to prey upon it, but their attacks made but little impression upon the hordes of the invaders. This was owing probably to the fact that swamps, in which the tamarack abounds, are but ill suited for the abodes of ants and ground beetles.

The pest was clearly beyond human control. Ornamental trees around dwellings or in parks might, it was thought, be saved by "spraying," but beyond this nothing could be attempted.

The appearances, the life history, the operations of *Nematus Erichsonii* have all been minutely described; and allusions have often been made to the destruction wrought by the insect in Canada, but on this last point but little definite information has been given. With a view to arriving at something more precise in regard to it, I, a few weeks ago, made a visit to the townships in which I had first seen the insect, and in Bury I met by appointment the Rev. R. H. S. Fuller, rector of Bury, Mr. John B. Maddocks, superintendent of lumbermen, and Mr. Robert Clark, one of the leading farmers in that section. From conversations with these gentlemen, and from personal observation, I was able to gather the following particulars.

The tamarack swamps of the Township of Bury occupy about one tenth of its surface, or 640 acres, and show on an average forty marketable trees to the acre. The largest of these trees are about 2 feet 6 inches in diameter at the butt—one was found having a diameter of 2 feet 9 inches. The usual size is 2 feet. This represents a growth of 200 years. Two hundred and twenty rings of annual growth was the actual record on the butt of one tree. Besides these marketable trees there are numerous others, in every stage of growth, which, under favourable circumstances, would, in successive years, have attained to marketable value. Of all these trees 98 per cent. are dead and the remainder dying.

Of the Township of Lingwick one-fifth, it is computed, is tamarack swamp. There is of such swamp one tract, lying partly in Lingwick and partly in Weedon, that is said to be five miles square. The destruction wrought in all this section is proportionate to that in Bury.

The tamarack as a shade tree is less valued than the pine, spruce, balsam and cedar, for the reason that its foliage is deciduous; but in the summer season when grown in the open, or the arboretum, it is a peculiarly graceful and beautiful object. For a short period also, in the autumn, when it has assumed its golden dress, it presents a pleasing contrast to the evergreens above named. Its wood, however, is valuable for many purposes. It is close-grained and firm, and resists the action of moisture, and, on these accounts, is prized for sleepers in buildings, railway-ties, and for fence-posts. As fire-wood, it is worth in the towns about $3 per cord. But the chief value of tamarack is for the purposes of the ship-builder.

---

*Dr. Lintner, 5th Report on the injurious and other insects of the State of New York, p 22.

†18th Ann. Rep. Ent. Soc. of Ont. p. 32

‡Ibid.

§18th Ann. Rep. Ent. Soc. of Ont. p. 32.

Rep. of Proceedings of the Convention of fruit growers held at Ottawa, 1890, p. 69.

From the swamps of Bury the knees and other timbers have been cut for vessels ranging from barges of thirty tons to brigs of 400 tons burden. The firm that is operating in this section of country is that of Benjamin, Lewis & Company, of Bangor, Maine. One million feet, board measure, will, by the close of the season, have been cut by them in the present year, in the Township of Bury alone I shall base my estimate of the loss sustained by the township through the saw-fly, upon the operations of this firm.

In former days when the timber was sound, $3 per 1000 feet on the stump, board measure, was paid for it. Now, through waste and general deterioration, the trees are worth only one-half their former price. Sap-rot commences very soon after the death of the tree, and by the second year has proceeded to a very sensible extent. Various kinds of "borers" then make their assaults, and penetrate the heart wood, hastening the decay of the tree. It is believed that in three years, through use and decay, the supply of tamarack throughout the country will be exhausted.

The borers that I found at work in the tamarack were larvæ belonging to the families Buprestidæ, Cerambycidæ and Elateridæ. I also found one or two cocoons of a Hymenopterous insect.

As we have seen, there are in Bury 640 acres of tamarack giving on the average forty marketable trees to the acre, or 25,600 such trees in all. Every tree contains at least 400 feet, board measure, of lumber. This gives for the whole forest 10,240,000 feet, which, in a sound condition, would have been worth $30,720, and which left standing would, under favourable circumstances, have been increasing in value. On the 1,000,000 feet that will have been secured by the end of the season, there will be a direct and immediate loss of $1,500. Supposing, which is hardly probable, that 1,000,000 feet at the same price will be cut next year, there will yet be 8,240,00 feet of lumber, representing $24,720 in money value entirely lost to the township, besides the value of the younger trees which would have been a source of income in future years, as they successively attained perfection.

The tamarack forest of the townships is a thing of the past. There seems to be a law of nature, that, when one growth of trees is swept away, another of a different kind shall succeed it. The hemlocks and pines of our mountain sides give place to the poplar and the white birch. The tamaracks will propably be succeeded by the American arborvitæ or white cedar (*Thuja occidentalis*). And, if there were no such natural law, the world is too old, its population too vast, and land in the temperate regions too valuable, for us to suppose that large tracts of lowlands will be left in a state of nature for 200 years to come.

The value of the Canadian tamarack was only beginning to be understood in the foreign market. The demands for it were increasing, and with increased demands better prices would have come. All things considered, I do not think it an exaggeration to say that the loss to the Township of Bury alone, through the attacks of *Nematus Erichsonii* may be estimated at $50,000, and that of Lingwick at double that sum. And when we consider that the ravages of the insect have extended through the townships, and the seigniories,* and into the country beyond to its utmost known limits, we are brought to the conclusion that *Nematus Erichsonii* has been the worst insect pest that has ever visited the Province of Quebec. It has acquired the "bad eminence" of a position in the rank of infamy above the midge, the weevil, the potato-beetle, and the army-worm.

With its food-plant the insect must of necessity disappear, and in years to come the specimens preserved in our cabinets will be regarded as rarities.

---

*In the Seigniory of Lotbiniere alone there are 100,000 acres producing more or less tamarack to the acre.

ON SOME OF THE COLLECTIONS IN ENGLAND AND THE GERMAN EMPIRE.

BY GAMBLE GEDDES, TORONTO.

It gives me great pleasure, Mr. President and gentlemen, to read to you some notes upon the collections I had the privilege of examining during a stay of some months on the continent and three weeks in London, England, when returning to Canada.

Crossing from Hoboken, N.J., by the German Lloyd S. S. Aller, the first entomologist I visited upon landing at Bremen in Germany was our old friend and collaborator Aug. R. Grote, and busy as he was about other matters in general, but music in particular, he found time to take me to see Mr. Lahmann's breeding room, where I saw a large number of the larvæ of Europe feeding, and also hundreds of pupæ ready for shipping to different parts of the world. In this collection I saw principally the Arctiadæ and Bombycidæ, but likewise many Papilios—and it was a matter of wonder to me, to see how Mr. Lahmann kept alive the food-plants for these larvæ in such a dark room as he kept them in. For the benefit of the members of the Society who might like to correspond with Mr. Lahmann, I may state that he is always ready to exchange for N. and S. American species, those of Europe, and he has succeeded in breeding many rarities in large numbers. His address is, Albert Lahmann (Ambrill Strasse 8) Bremen, Germany.

My next visit was to Dr. Meyer, director of the Natural History Museum at Dresden. Professor Ramsay Wright having furnished me with a letter of introduction, Dr. Meyer immediately put me in the hands of Dr. Heller the entomologist of the Institution, who was most attentive to my wants, and during my several visits to the collection, always managed to spend a portion of his time with me and placed the cabinets and library at my disposal whenever I desired to refer to them. Here I first observed the drawers made with glass at top and bottom, with only thin strips of cork fastened in to pin the specimens to. Any collector who has not already seen these drawers can readily appreciate the use of them. Instead of mounting Lepidoptera showing the upper and under surfaces, it is only necessary to set them right side up, and in order to examine the under-sides, all one has to do, is to turn the drawers up-side-down when the reverse sides can be examined through the glass, thus saving space and time.

This collection is well worth a visit from any traveller for it embraces fine representations in all classes of insects from every part of the globe. A number of collections have been donated to this museum by private individuals, and many purchases have been made. The whole lot have been carefully selected from and the best specimens consolidated into a fine collection of reference not only for the entomological students of Germany but for foreigners wishing to consult the cabinets. The books of the library are as carefully selected as the insects in the collection. I might mention that the moths and butterflies of Europe are particularly fine.

Herr Ribbe's collection was sold by auction during my stay in Dresden, and the chances of purchasing were remarkable. To give an idea, a fine cabinet, cork-lined drawers with glass tops (16 drawers) filled with inflated larvæ with the food-plants, was sold for 38 marks, equal to $9.50 in our money.

I next went to see Dr. Staudinger, at Blasewitch, on the Elbe, and here I saw the most wonderful collection that I have ever come across.

Dr. Staudinger has named his place the "Villa Sphinx," and has built the house on purpose to accommodate the vast collection which for years and years has been accumulating.

Here one can see most of the insects known and a large number of the collector's own types, as well as a very numerous collection of unnamed species, to which Dr. Staudinger was devoting his time (in describing) during my visit of nearly six months at Dresden.

The room that attracted my attention most, after seeing the collection, was the room used for the students or pupils as they are called, and where all the mounting, spreading, packing takes place as well as addressing boxes, and shipping insects ordered from every quarter of the world.

It is like a bee-hive and no one has time for idling here. One student is taking out specimens from papers and envelopes, another sorting and laying aside any that are difficult to determine (these are afterwards handed over to an experienced hand for determination). The third pupil is placing specimens in relaxing jars and glasses of wet sand. The fourth and fifth are mounting and spreading and often patching and mending broken specimens. The packing and shipping is done in the most orderly and business-like manner, and by dusk everything is finished for the day.

I noticed an improvement upon our relaxing tins and jars which may be worth mentioning. Glass covers are used and the advantage is obvious, as one can see the specimens through the glass. They are very much the shape of the glass dishes kept at the railway stations in the restaurants for sandwiches, etc.

The spreading is done rather differently from what I have seen in England and the United States in that very short pins are used for fastening down strips of paper over the wings, and forceps are used entirely (and never the thumb and forefinger) for tightening down the pins. Twenty specimens is considered a good hour's work of the smaller species and more of the larger ones can be satisfactorily mounted and spread by a good pupil.

Dr. Staudinger is engaged upon a gigantic work upon the Paleo-Arctic Fauna, which he is most anxious to finish.

At Berlin I saw Alex. Bau's collection and went twice to call upon Mr. Howarth but was not successful in my endeavours to meet him or to examine his fine collection. In Berlin I met Prof. Ramsay Wright, of the Toronto University, who was hard at work at Prof. Koch's laboratories. He very kindly took me to several places of great interest to a naturalist.

Arrived at London, I first went to see Mr. Henley Grose-Smith's collection of diurnals only. He had nearly doubled his collection since I last saw it in 1882. A splendid addition of new things had just been added, collected by Mr. Woodford, in the Solomon Islands. This collector underwent great hardships and evidenced his pluck by living for 18 months amongst the worst cannibals that are known in the islands of the Southern Pacific Ocean. Mr. Woodford's collection has been of great assistance to scientists interested in the insects of these southern climes.

Mr. Grose-Smith furnished me with a letter to Mr. Kirby, at the South Kensington branch of the British Museum, and no one could have been kinder than was Mr. Kirby. Always busy, he seems to be able to find a little time to devote to collectors who come to see the collections. He went through the Coliadæ with me and helped to clear up a number of doubtful species which I had upon my mind.

Last of all, I visited the Insect House, at the Zoological Gardens, in Regent's Park, and saw the breeding cages. A large number of North American diurnals, and all our large moths are to be seen here in their different stages of metamorphoses.

Europe, Asia and Africa are also well represented in this respect, and one is always sure to find something new and interesting to repay a visit to Mr. Bartlett's Insect House, at the "Zoo."

A MICROSCOPICAL EXAMINATION OF AN UNEXPANDED WING OF CALLOSAMIA PROMETHEA.

BY J. ALSTON MOFFAT, CURATOR, ENTOMOLOGICAL SOCIETY OF ONTARIO.

In the July No. of that ably conducted and instructive English magazine, *The Entomologist's Record*, the subject of wing expansion is discussed in its various aspects. Amongst those taking part in it, Dr. Buckell remarks that, "as to expansion: the unexpanded wing is a miniature of the expanded. Newman, at p. 14 of *British Butterflies* quotes from Kirby and Spence to the effect that the two membranes of which the wing is composed are, in the unexpanded state, corrugated into a vast number of folds, transverse as well as longitudinal, and that the nervures are folded. Are any of our readers microscopists? If so, will they try and verify this statement." After reading that, and considering the matter, it occurred to me that I might be somewhat fortunately situated for making an attempt at discovering the facts of the case. First, because I was in possession of a number of the cocoons of large Bombycids which had failed to produce moths, therefore some of them might be found to be good subjects for investigation. And secondly, although not a microscopist myself, I was sure I could obtain the able and willing services of some members of our Microscopical Section : so I examined my cocoons. I had four *Samia Cynthia*, out of nine which I had received from Mr. James Angus, of New York. In three of them the caterpillars had failed to transform, the fourth contained a pupa. I had also two *promethea*. In one was the pupa of a large female, but so soft that it would not endure handling ; in the other I found a small male, dry and firm. I called the attention of Mr. Foot, one of the younger members of the section to the subject and read to him Dr. Buckell's request ; he at once responded with, "Let us try." I should state here that the investigation extended over several weeks. My method was to take notes of what I saw, or thought I saw, at any time during its progress, compare and correct them afterwards, and if there was conflict or uncertainty, I had further views to verify. But before entering into details I will quote more extensively from Kirby and Spence. In vol. 3 p. 293, we read, "To understand more fully the cause of this rapid expansion and development of the wings, though often exceedingly thin, they are always composed of two membranes, having most commonly a number of hollow vessels running between them. These tubes, which after the French entomologists, I would name nervures, contribute as well to the development of the wings as to their subsequent tension. In the pupa, and commonly afterwards, the two membranes composing the organs in question do not touch each other's inner surface, as they afterwards do ; and being moist and corrugated into a vast number of folds like those of a fan, but transverse as well as longitudinal, and so minute as to be imperceptible to the naked eye, the wings appear much thicker than in the end. Now, as soon as the insect is disclosed, a fluid enters the tubes, and being impelled into their minutest ramifications, necessarily expands their folds; for the nervures themselves are folded, and as they gradually extend in length the moist membranes attached to them are also unfolded and extended. In proportion as this takes place, the expanding membranes approach each other, and at last, being dried by the action of the atmosphere. become one." This description seems to be taken from observations made of butterflies, which will doubtless differ in some respects from moths. We commenced operations by trying the Cynthia first. The wing-case was thick and hard ; when broken and removed the winglet was disclosed lying close to the shrunken body, smooth and transparent as that of a fly ; not the vestige of a scale visible, nor an indication of where they were to come from. Under the glass it was a most interesting object, but worthless for our purpose. The question forces itself on our attention here, At what stage of the pupal period does the scale begin to grow?

We next took up the Promethea, which proved to be in fine condition for the investigation. The wing cover came off freely and clean, disclosing the winglet scaled and coloured and apparently ready for emerging ; when it was removed, it measured just over three-eighths of an inch from joint to apex, and one-fourth of an inch across the widest part ; which possibly might have expanded to one and a half or two inches.

The first survey of it through the glass at once suggested compression, lateral and longitudinal, the minute scales were so crowded on one another that they almost stood erect, yet the ornamentation was distinct. When the scales were removed the transverse corrugations were disclosed, crossing the wingletat quite irregular angles, but the term "foldings," applied to them would convey an erroneous impression; drawings or gatherings would be more correct. They had an exact resemblance to some gatherings in ladies' dressmaking. The front edge had a singularly knotted appearance which I could make nothing of at the time.

Longitudinally, the foldings were unmistakable, but with nothing like the regularity of a fan ; they were of quite unequal length and depth ; some were but a slight depression, others so deep that I could not remove the scales from them ; none of them extending from base to outer angle of wing. One would commence near the base, run deep and terminate in a loop. Another would begin opposite to the middle of that one, run beyond it and stop. Others formed plaits on the outer angle. all inclining to be wavy, as if they had been subjected to longitudinal pressure. These foldings would account for the broken lines of the transverse corrugations.

My next effort was to lay bare the nervures ; for this end I soaked the winglet in water. It came out an elastic gelatinous mass. I tried hard to separate the upper and under membranes but without success. I turned it over to examine the underside, and found that the membranes had parted over some of the heavy nervures at the base of the wing, disclosing their structure completely ; the end next the joint of one of them turned upward, and I could see into the hollow tube as far as the bend would allow, the walls appearing to be very thin ; inside they were smooth with a waxy look. A general survey of the exterior reminded me of an earth-worm severely contracted. A close inspection showed them to be segmented ; one end of the segment was prominently rounded, sloping suddenly to the other end, entering the rounded end of the one next to it, and so on along the portion of the nervure laid bare, without any perceptible diminution in its size. If this structure is what is referred to in the statement, " the nervures themselves are folded," then the term is badly chosen and very misleading.

The condition of the costal edge of the winglet was now clearly displayed, but difficult to describe. If a piece of stiff twine is placed on the table, doubled back and forth in as short bends as is possible to give it, kept in place and looked at from above, it will give a good idea of the costa when it is viewed edgeways ; then cut the bends on the side representing the centre of the wing, and it will have a strong resemblance to the upper surface of the costal edge. The term, crimped, or crimpled, would well express its condition.

These views were obtained, and could only be obtained when the winglet was saturated with moisture. We may find in this direction an almost unlimited field for observation. From what we know of insects, we should be warranted in expecting as much diversity to characterize this as any other department of their history. A general principle may cover the whole, but with very considerable latitude in working out of the details.

The difference between the expanded and unexpanded wing is great in more ways than size ; the wrinkled thickness of the nervures in the one, is in striking contrast to the smoothness and fineness of the other. The amount of space between the rows of scales is very suggestive ; in the unexpanded wing the roots of the scales are close together, each row being situated on the crest of a wrinkle ; in the expanded wing the tips of one row of scales just cover the roots of the row in front of it ; when the scales are removed, the space between the rows of roots is a smooth dull coloured membrane. When contemplating this, I thought I saw an explanation of what I had observed when rearing Cecropias. Occasionally I would get one of unusual size, but they were always thin in vestiture and defective in colouring. Now if each specimen of a species has the same number of rows of scales on their wings, which may be the case, and the membrane of one becomes unusually extended, without a corresponding increase in the size of its scales, we can easily see what the consequences would be.

But the expansion of the scales themselves has to be accounted for. This takes place at the same time as that of the wing. From whence comes the motive power ? It is known that the roots of the scales are bulbous, set in sockets, the bulb being under the surface of the membrane ; and that the scales are double, open inside, but closed at the outer end, forming a sac ; may not this opening extend through the stalk and root of the scale, connecting with the space between the two membranes of the wing, and receive from thence the impetus for its expansion ? I tried to settle the question by various observations but obtained nothing definite, yet this seems to be the direction in which we have to look for the result produced.

I bethought me of the *Luna* I had seen when it had just emerged from its cocoon, which was pure white, resembling a bit of swan's down, so I examined the expanded wing of one, but I found I had got into an entirely different field of observation, and one of a most surprising character; everything seemed to be the very reverse of what I had seen in Promethea. The scales were long, fine, and of a hair-like form, strewed thinly over its surface in quite an irregular manner; the beautiful green colour so much admired in the Luna, is not given off by the scales but from the membrane. The scales are yellowish, and the more numerous the scales the more yellow is the tint given to the wing. Many of the scales separate into branches, these branches separating again into finer ones, resembling some grasses we have seen. The scales around the "eye spots" are of the ordinary scale formation, the membrane under the coloured scales partaking of the colour of the scales. All of which goes to show that it is not safe to trust to one insect in order to get reliable information about the constitution of another.

Mr. Fenn calls attention to the usually more rapid expansion of the wings of butterflies as compared with the moths. On one occasion I was looking at the chrysalis of a *Danais archippus*, which I had fastened to a door frame, a little above the level of my eyes, when the pupa case burst, and the butterfly fell fluttering to the floor; by the time it had reached it the wings had attained their full length, but limp as a wet rag. With what force must the fluid be injected to the very extremity of the wings to produce such rapid extension! It gives no opportunity for observing the manner of its accomplishment; it is more like the relaxing of a compressed spring than anything else.

For such an investigation, probably the best results could be obtained from the examination of a fresh pupa, secured just before emerging.

Since completing this, I have had the opportunity of making another investigation.

In the latter part of October I received from Dr. Woolverton a fresh chrysalis of *Danais archippus*. I suspended it in a convenient place for observation, doubting whether it would mature or not at that season of the year. On the 5th of November it still retained its delicate, pellucid green colour, no perceptible change having taken place in it, except perhaps that the golden spots were more conspicuous. On the morning of the 6th it had become a deep, dull, bluish black; by noon the red colour of *archippus* was quite perceptible through the wing-cases, and by evening its black lines and white spots were distinctly seen. It had been maturing so rapidly that I was afraid to leave it over night, least it might burst its bonds before morning, so I gave it an alcoholic bath, which arrested its progress. Next morning it had an angular look, having shrunk a good deal. The outer integnment peeled off freely, the pupa being well matured and firm to the touch. It required quite an effort to remove the winglet from the body, so completely had it matured. When taken off it measured nearly three-fourths of an inch in length, and was a perfect miniature of the expanded wing. A great quantity of fluid flowed from the wound made by the removal of the winglet, which soon reduced the body to less than one-half of its original diameter. The scales had the same crowded appearance as in Promethea; their tips had a flattened look, as if they had been pressed upon when growing, which turned them downwards; those of the fringes on the outer angle appeared as if they might be of their full length.

When the scales were removed the transverse corrugations were disclosed, showing them to be very much finer than those of Promethea, but there was not a trace to be seen of longitudinal foldings, not even on the outer angle; the lines of the corrugations crossing the wing were quite wavy, which would no doubt admit of a good deal of lateral expansion, but there were no plaits to let out, so I suspect there must be a considerable lateral compression to make up for it, although I could not detect anything in the membrane looking like longitudinal corrugations.

The winglet dried so rapidly that I made no attempt to lay bare the nervures, but there was no crimpling of the costal edge as in Promethea; the unexpanded wing being identical in form with the expanded one, which was not the case in Promethea. All going to demonstrate the certainty that we have in this direction abundant scope for investigation, each species probably having something peculiar to itself.

THIRD ANNUAL MEETING OF THE ASSOCIATION OF ECONOMIC ENTOMOLOGISTS.*

AUGUST 17, MORNING SESSION.

The third annual meeting was held in the Columbian University building, Washington, D.C. The meeting was called to order at 9.45 a.m., President Fletcher, of Ottawa, Ontario, in the chair. Thirty-eight persons were present, among whom were the following members:—

W. B. Alwood, Virginia; W. H. Ashmead, District of Columbia; G. F. Atkinson, Alabama; M. H. Beckwith, Delaware; Lawrence Bruner, Nebraska; A. J. Cook, Michigan; E. W. Doran, Maryland; James Fletcher, Canada; L. O. Howard, District of Columbia; D. S. Kellicott, Ohio; J. A. Lintner, New York; C. L Marlatt, District of Columbia; Herbert Osborne, Iowa; Theodore Pergrande, District of Columbia; G. H. Perkins, Vermont; E. A. Poponoe, Kansas; C. V. Riley, District of Columbia; J. B. Smith. New Jersey; E. B. Southwick, New York; J. M. Stedman, North Carolina; F. M. Webster, Ohio; H. E. Weed, Mississippi; F. H. Chittenden, District of Columbia; A. B. Cordley, District of Columbia; G. H. Hudson, New York; B. P. Mann, District of Columbia; M. E. Murtfeldt, Missouri.

PRESIDENT'S INAUGURAL ADDRESS.

The President, James Fletcher, Dominion Entomologist of Canada, then delivered his annual address.

GENTLEMEN,—It is not my intention to delay you upon this occasion either with a lengthened or an elaborate address, but I shall endeavour for a short time to direct your attention to some subjects for discussion which I trust may be found of interest and benefit to all present. These subjects are all of a nature which it seems to me may more appropriately be brought before this Association than before any of the other entomological organizations.

I am of the opinion that our meetings, to be of the greatest use to economic entomologists, should be largely of an informal nature; in fact, they should be meetings where workers can meet students in the same line of research and exchange experiences. We must all, to a large measure, go over the same ground and learn for ourselves the general principles of the structure and habits of insects which affect so closely the choice and application of the proper remedies to avert or mitigate their attacks upon crops. This training, however, is essentially necessary in the same way that learning the alphabet is necessary for one who wishes to read or speak accurately; but it is beyond this point that the advantages of our Association may be recognized. There is not, perhaps, any single line of practical science, certainly not one approaching it in the importance of the results attained, in which students have to work so much alone and cut off from companions of congenial tastes. Marvel at it as we may, we, who know the exquisite beauty and sustaining charms of the insect world, cannot but acknowledge that entomology is not a popular study, and although in this respect there is a gradual change taking place for the better, still all the same it is with feelings akin to amusement and patronage that the ordinary farmer allows himself to listen to arguments that there is after all *some* use in studying the habits of insects.

Probably most of us present have occasionally had the opportunity of addressing farmers' institute meetings, and know well that although, after the meeting is over, there are invariably more inquiries about common insect crop pests than any other subject which may have been discussed, and when the meeting breaks up it is always the entomologist who is detained to answer the questions of those who did not like to stand up and speak before the others ; yet for all this, probably most of you will recognize the extreme similarity which exists between the expectant smile which meets you from every part of the audience when you are introduced to speak on insects in a new locality and that which greets the announcement of the high-class comic songs which are usually dispensed on those occasions. You also know the necessity, and have probably been often asked by the chairman at these meetings in so many words, to begin with some joke to "catch the attention of the audience." An appeal must then be made to their pockets, and you must remind them of the crops destroyed and dollars lost by depredations of pests which levy tribute every year, as the turnip flea-beetle, cut-worms, potato-beetles, etc.

---

*The following report is taken from "Insect Life"—the official publication of the Entomological Division of the Department of Agriculture, Washington, D.C.

You explain the simplicity of many remedies and the great saving that will follow their application. They had not thought of these things ; gradually the smiles die out and the other extreme of seriousness is reached. They awaken now ; with bodies leaning forward and heads raised they drink in every word ; their eyes brighten and their mouths gradually open with wonder at the losses they have suffered and might have prevented had they but known of these simple things before. It touches them to the quick to be told that ten cents' worth of Paris green would have saved their crop of gooseberries or currants ; have done away with the necessity of sowing their turnips two or three times at a hundred times the cost ; that ten cents expended in spraying an apple or plum tree would have given them a return of three or four dollars' worth of good fruit ; that by simply wrapping a piece of newspaper around their young cabbages or tomatoes at the time of setting them out they might have saved a loss of perhaps 75 per cent of their crop from the ravages of cut-worms. In short, that by following the advice of entomologists, those who study the habits of what they had always called indiscriminately "bugs," they might have saved much that had disappeared from under their very eyes.

But I need not now pursue this thought further. Encouraged by the apparent interest taken in the subject by the audience, one is sometimes tempted to speak too long, but we must be discreet : farmers, as a rule, prefer a few new thoughts at a time and to have these plainly put. Having finished, we perhaps sit down amidst applause and requests to go on, and perhaps hear such complimentary remarks exchanged as "I tell you what it is, there *is* something in what he says," or, in a tone of surprise "That bug man was pretty good." No. Farmers and ordinary individuals throughout the country who are dependent upon them for food do not know, nor as a class appreciate, what they do now, might, and will in the future owe to the labours of the entomologist. The consequence is that those who do take up the study are few and isolated from each other. Moreover, I maintain that there is no branch of natural science or practical agriculture to which it is second in importance. The amounts lost and the value of produce which might be saved every year in our staple crops alone, by following the advice of a competent entomologist, are so enormous and of late years have been so often proved, that before long the value of these studies must certainly be recognized. The chief hindrance is the widespread and incomprehensible ignorance on the part of both growers and consumers of agricultural produce of the present generation. This ignorance is rapidly being dissipated by means of the various agricultural colleges and experiment stations all over the world, where the rising generation is being trained.

It will soon be seen that the scientific or accurate study of the habits of insects, by which we are enabled to prevent the injury or loss of existing crops, of which we have already learned the use or necessity, confers far greater benefits on the community at large than the discovery or introduction of new products of which we have not yet felt the need. But there is no natural study which presents so many different aspects, nor which provides so many subjects concerning which its students, although they must know something, find it quite impossible to inform themselves thoroughly, which, in short, demands that its different branches must be taken up by several specialists bound together by some bond, so that the knowledge gradually accumulated by one may, at need, be available for all. Such a bond I believe we have in the Association of Economic Entomologists, whose members have an opportunity of meeting once a year a large number of colleagues working in the same field, but upon different lines, with whom they can compare experiences and particularly can discuss any difficulties which may have arisen in the prosecution of their work during the year.

It is for this special reason that I set so much value upon an informal style of meeting, where the Association can, as it were, go into committee and a member can not only bring specimens for exhibition or identification, but can ask as many short questions as he likes and receive answers at once, together with opinions and comments, if necessary, from all present. Methods of applying and the most advantageous materials and proportions to be used in the manufacture of insecticides, the discussion of new discoveries either of materials or apparatus which may have come prominently before the public during the year, the most convenient modes of collecting, mounting and preserving material for study—all these seem to me to be subjects particularly appropriate for discussion before our association, concerning which, too, information is so badly needed now that the very progress of the science is seriously impeded by the want of it and which I think can not so well be brought up before any other existing body. Now these matters, although small in themselves, when neglected become of great importance, from the negative results which come out of them. I therefore took the liberty of addressing a circular to each member of the Association as well as to all economic entomologists of whom I could find the postal addresses, requesting them to come to this meeting prepared to derive the greatest possible advantage from intercourse with the eminent entomologists resident at Washington and those others who would surely be gathered together here; also at the same time to try to make the meeting enjoyable to others by favoring us with short notes of their operations during the year.

I am pleased to announce that one of our foreign members, Miss Ormerod, has sent us an interesting account of her work during the past year which will be read during the meeting.

Thanks to the kindness of Professor Riley and the trouble taken by our secretary, Mr. Howard, arrangements have been made that the visiting entomologists may take the greatest advantage of the opportunities afforded by the meeting being held at Washington, and I would suggest that all should improve this opportunity by examining and above all by taking copious notes of the various entomological machines, so many of which have originated in the Division of Entomology, under Professor Riley. To-morrow a certain time will be devoted to the discussion of insecticides and the machinery for their application. I am convinced, after many failures, that success in treating insects just as much depends upon having the proper apparatus as upon the insecticide used, and I draw your attention now to this subject because of the exceptional advantages offered here, not only from having the machines to examine, but also the able members of the staff to explain their uses. For my own part I have found it quite impossible to judge of and compare the merits of these, in many cases, expensive machines, by simply reading the available descriptions, and I think we should make the most of this opportunity. My only regret is that every economic entomologist in the country is not present. You will see by the printed programme which has been submitted to you that there are papers upon many important subjects and arrangements have been made by which our meetings shall not clash with those of either of the other bodies before which entomological papers are to be read, so that there is nothing to prevent members wishing to do so from being present at the reading of all these papers during this week. By a mutual arrangement with the president of the Entomological Club of the A. A. A. S. authors have been requested to submit papers of economic interest to this Association, whilst those of a scientific or systematic nature will come before the club or the section of biology.

I trust, gentlemen, I may not be considered presumptuous if I make use of the opportunity which you forced upon me when you elected me to this honourable position at the last annual meeting, to lay before you some ideas which have occurred to me by which we can make our work more useful and also secure better facilities for making it popular throughout the country. Why is it that the botanist, the chemist and the geologist do not elicit the amusement only, from the ignorant, which is called forth by the entomologist in prosecuting his investigations? While not for one moment wishing to belittle their work I maintain stoutly that not one of these or all combined can compare with entomology in its possibilities when tested by the rule of *Cui bono?* The silent respect accorded these sciences is no doubt largely due to supposed, not to call them fictitious, virtues.

The botanist has from ancient times been inseparably associated with medicine and the discovery of a panacea for all the ills to which mortal man is heir. Even in the wilderness, with a handful of herbs he is exempt from molestation by either Indian or white man run wild. The chemist again deals with things unintelligible to the masses, illustrated with loud noises and nasty smells, and there has come down with him from the middle ages a sort of twin-brotherhood with the alchemist and the practisers of other dark arts—the possibility of his discovering in his laborarory an easy means of creating, without hard work, gold, that which is by most men most coveted, and for which many will commit crime or be induced to acts mean and contemptible. Too true even to-day are Virgil's words: "*Quid non mortalia pectora coges, Auri sacra fames?*" What will you not compel mortal breasts to do, cursed lust for gold? The geologist, with his pick, or his humble but sordid, vulture-like follower, the "prospector," means to the uneducated eye a public benefactor, who may find that purest but most degrading metal, the search for which is the mainspring and motor of so many lives. Who that has travelled in the far West has not seen the magic effect in removing difficulties of the words "I am working for the Geological Survey!" And yet—I say not as a wail—there is no such respect for the "bug sharp" or "grasshopper tenderfoot," who has saved them there, in that very country, the very means of subsistence, and he is only treated to shakes of the head and sinister looks, as though he were some dangerous character, when in answer to their questions "What are they for?" "What do you do with them?" he can not assure his interrogators that he either eats or, that which last of all he would do, sells his specimens.

But I have said that the change for the better in this respect has even now set in. Already the most highly civilized nations of the world, nobly headed by the Government of the most practical and energetic people on the face of the globe, the inhabitants of the United States of America, have seen the advantage of appointing specialists who can devise means for the prevention of the enormous losses of revenue due to the attacks of injurious insects. Germany, England and her colonies, notably Canada and particularly the province of Ontario, France, Italy, and other nations, all have followed the lead, and our favorite science has now changed from a study and amusement of the few to one of the most important branches of practical agriculture, the elements of which must be known by all engaged in tilling the soil or they will surely suffer. Already it finds a place upon the curricula of many of our schools and colleges and before long will force itself upon the notice of others. There has been a rapid development in this line, not only in this country but everywhere, during the last two or three years, and many new men have come to the front. My presumption does not carry me so far as to criticise these or other workers; but perhaps I may be permitted to refer to some of the dangers which beset a newly appointed entomologist, and particularly a young one. In such a task one must necessarily (for safety's sake) refer to what has occurred to himself in his own experience. The first consideration must of course always be to succeed in the work which you have undertaken, and I can not help thinking that some err considerably when they think that they will be expected to know everything and must answer every question off hand. On this point I am speaking particularly of our relations with farmers, who are as a rule very practical men, made so by the exigencies of their lives, but who are frequently those who have not had the advantages of a liberal education, and consequently have not the consideration and moderation which that alone gives. Moreover, as there is no policy so poor, because it is invariably seen through, as that which prompts an entomologist, when seeking information from one whom he knows is better posted than himself, to try and hide his lack of knowledge by making excuses why he does not recognise that exact specimen, or by asking indefinite questions in the hope of getting what he requires, without in so many words acknowledging his ignorance, so in the same way does he expose himself to the contempt and want of confidence from those in whom he most desires to inspire respect, by trying to put them off with an indefinite answer. It has been my experience that a modest and honest acknowledgment of ignorance is no disgrace and brings no degradation with it, whilst an assumption of knowledge which we do not possess is a constant menace, which if once detected is never forgotten. It is the old tale, "honesty is the best policy;" but this must not end the matter; we must be honest with ourselves, and having once detected our lack of knowledge upon any subject which comes under our notice, we must use every means in our power of supplying the deficiency, and if we make a systematic study of every investigation which we undertake, taking all the time careful records of what we see, even with regard to the commonest insects, we shall frequently have the satisfaction of finding out that not only have we observed all that others have, but many other things besides, which will raise our simple investigation from a mere study into a scientific record. No man can possibly know everything even about his favorite study, and the sooner he knows this the better for his work.

A subject frequently referred to, but which can not too often be repeated is the necessity, or even, if we put it in another way, policy, of making the fullest acknowledgment of all assistance received from others, whether it be from their writings or otherwise. I know of nothing which so belittles a man's work as to find that it is derived without acknowledgment from some one else. It is not at all infrequent, I am sorry to say, to find whole sentences and clauses inserted in published writings without even quotation marks. An evidence of this is found in the innumerable mistakes which are perpetuated and handed down from author to author before they are detected as errors. Again, too great stress can not, I think, be laid upon the propriety of invariably acknowledging the source of all illustrations used. These are of the greatest assistance, and yet they are frequently used without a word of acknowledgment.

Now, all of this is essentially unwise from the base standpoint of policy alone; for although nothing may be said about the matter, be sure that every instance is noticed and stands forth as a black blot on the face of good work.

A defect which is occasionally discernible in some writings upon economic entomology is the want of a thorough grounding in the first elements of the science. This is easily detected; there is an uncertainty and indefiniteness about the work. It is like that of an artist who begins to paint pictures before he has learned to draw well. A far greater blemish, however, which has, I think, seriously impeded progress and effective work, is the fact that entomologists as a rule do not know enough about the collateral subjects which affect their studies. Their efforts are for the most part directed towards the protection of farm crops, and yet how few make a study or have much knowledge even of the elements of farming and horticulture, the growth and management of the various kinds of crops, the effects of different fertilisers, early and late planting, and the rotation of crops, the pruning and cultivation of trees and shrubs.

All of these are of paramount importance. The knowledge is necessary, and therefore must be acquired. A certain knowledge of botany is most important and will be constantly giving advantages to the one who possesses it over those who do not.

With regard to the presentation of the results of our labors for the use of others, one thing which should be avoided as much as possible is the recommendation of remedies which we have not actually tested ourselves. There are so many useless and untrustworthy remedies now published, particularly through newspapers, that great caution is necessary. Different conditions sometimes require differing remedies, according to circumstances: but I think that the best and fewest possible remedies should be given for any insect treated of, so as to simplify the application as much as we can. There is no doubt that the most valuable remedies are those which are simplest. As the late Mr. Frazer Crawford, of South Australia, has well said, a remedy must be (1) *effective*, so as to attain the object aimed at; (2) *inexpensive*, so as to be practical—worth the trouble and expense of application; (3) *simple*, so as to avoid as far as possible all chance of mistakes in applying it.

At the last meeting of the Association, in Champaign, Ill., I had the honor of a conversation with Assistant Secretary, the Hon. Edwin Willits, and he mentioned that he was frequently asked for information as to the advisibilty of large expenditures for entomological purposes, and that although entomologists frequently spoke of the large losses from insects, we did not provide politicians—and particularly himself—with data by which they could explain and justify these expenditures, which those who understood them knew to be of such enormous importance, and when we wished to point out the great injuries done by insects we had to go back continuously to old published records which we had all been quoting for upwards of ten or twenty years. Now we find upon investigation that accurate estimates of damage done by insects are exceedingly difficult to arrive at, and the figures are so large that we are rather afraid to quote them ourselves lest we should prevent rather than encourage investigation, and it has been the custom of entomologists to minimise the estimates for fear they should not be believed. Now the necessity has arisen, I think, and I lay it before the Association for action, in the direction of gathering together some reliable recent statistics in a short form, which may be printed for distribution, and which will cover the more important injuries to date, and the part the work of the entomologist has played in reducing injury or preventing loss, so that we may overcome this difficulty and provide legislators and ourselves with data with which to meet this argument. After a careful examination and great effort to obtain data I have found that there are certain of these large estimates which appear to be reliable. I think better results will follow the publication of a few quite reliable statistics, which may be taken as typical instances, than by accumulating a large number of items which would increase the chance of error and might not be read so carefully. By way of example I will refer to the Chinch bug. I have examined carefully the estimates which have been published concerning that particular insect, and the following are probably quite reliable and appear to have been made with due regard to all collateral considerations, as the increased value of the saved crop, the cost of remedial measures, and similar subjects.

In 1864 Dr. Shimer's estimate, which I find was drawn up with very great care, put the loss in the one state of Illinois to the corn and grain crops at $73,000,000. In Dr. Riley's Reports on the injurious insects of Missouri, we find in 1874 there was a reliable estimate of the loss to that State by the same insect of $19,000,000. In 1887 Professor Osborn's estimate, founded upon the reports of the correspondents of the State Agricultural Society of Iowa, put the loss in that State on corn and grain at $25,000,000; and lastly, Mr. Howard's estimate, as given in the entomologist's report for 1887, for the nine States infested by the chinch bug in that year, was $60,000,000.

Now, gentlemen, I think these statistics of the injuries to crops by one insect alone are probably as reliable as any that we can get, and they give a good argument which we may use as showing the depredations of insects; but it is not sufficient that we can convince people that great injury is going on; we must show that we are doing something to mitigate this injury. In Professor Comstock's Report for 1879 the estimate of the possible annual loss in years of general prevalence of the cotton Aletia is placed at $30,000,000 through the cotton States. The injuries by grasshopers in the different States of the Union and also occasionally through the British North American provinces have been so enormous that figures hardly give an idea of the injury they do, but they are known by all to be enormous.

As an instance, however, of what may be done to mitigate their attacks I would merely mention those for this year, which seem to have been very considerable. In the States of North Dakota and Minnesota it is probable that at least $400,000 have been saved on account of work done by direct advice of entomologists—work they have in some instances forced upon the farmers. Two hundred thousand dollars is a probable estimate of the amount saved by plowing the land last autumn. Another equal amount has been saved by the use of "hopperdozers." Professor Bruner tells me that a sufficient number of grasshoppers have been actually taken this year, which if left alone and allowed to lay their eggs might next year have devastated the whole crops of those two States and the adjoining parts of Manitoba. These successful operations have been carried on by the state entomologist of Minnesota, Professor Lugger, and by Professor Waldron, of North Dakota, ably aided by the advice and assistance of the agent of the Department of

Agriculture, Professor Bruner under Professor Riley's instructions; and I think it is no exaggeration to say that at least $400,000 have been actually saved in hard cash on this year's crop, not to speak of the enormous loss which would most probably have followed next year had they been left alone, and had climatic conditions been favorable for their increase.

The amount of damage done to crops every year is so vast that the figures excite incredulity from those who do not study crop statistics. The agricultural products of the United States are estimated at about $3,800,000,000. Of this it is thought that about one-tenth is lost by the ravages of insects. This is in many cases unnecessary. In short a sum of $380,000,000 is given up without a murmur and almost without a struggle by the people of the United States.

Crops of all kinds are injured, and simple remedies are known for many of the attacks and are more or less adopted. Some have already come into general use. Paris green is now applied to potato fields almost as much as a matter of course, as manure is to fertilize the soil. As an instance of how a saving may be made even in well-established methods, I give the following: Through the work of Mr. W. B. Alwood, of the Virginia experiment station, improved machinery and the water mixtures of poisons have come into general use amongst the farmers and potato-growers in the Norfolk region. and some of the largest growers now claim that they at present do for from $40 to $60 what used to cost them from $500 to $600. To-day in California and Florida, orange trees are universally treated with kerosene and resin emulsions or poisonous gas for scale insects.

In the treatment of cabbage caterpillars, pyrethrum diluted with four times its weight of common flour, and then kept tightly closed for 24 hours, leaves nothing to be desired, and thousands of dollars are yearly saved to small growers who most need the assistance.

Many excellent remedies have been devised by a mere modification of existing agricultural methods. Instances of these are found in the early and late sowing or harvesting of some crops, as sowing turnips between the broods of the turnip flea-beetle, the late planting of cabbage for the root maggot, the late sowing of wheat for the Hessian fly, etc. In the 1879 report of the U. S. Department of Agriculture was first detailed the only successful method of treating the clover-seed midge by cutting or feeding off the first crop before the young larvæ are sufficiently matured to leave the heads and go into the ground to pupate. This was simply the change of one week, by which not only is the insect destroyed, but the clover is saved in better condition than under the old method.

During the present summer Professor Osborn has discovered that a serious pest of the clover plant, *Grapholitha interstinctana*, a small moth, may be destroyed in all its stages by simply stacking the hay soon after it is cut.

In the Southern States Mr. Howard Evarts Weed writes to me with regard to the cotton worm: "The loss would indeed be great were it not for the fact that the planters keep it in check by the prompt application of Paris green in a dry form. The only method now used is to apply it by means of two sacks attached to a pole and borne through the plantation by a negro mounted on a mule who rides down the rows of plants. This gives perfect satisfaction, and the farmers of the state tell me that they want no better remedy for this insect."

Mr. F. W. Mally writes on the same subject: "The benefit which the public generally derives from the researches of economic entomologists is well illustrated by the result of the cotton-worm investigation published in the Fourth Report of the U. S. Entomological Commission. In that report estimates of damage, etc., are given, and I will only allude to the benefit which the planters have derived from the report. Formerly, planters waited until the August brood of the Aletia issued and depredated on their cotton. This brood may be called the migratory one, since it spreads over vast areas of cotton fields. At that time, too, the planters used Paris green just as they purchased it from the dealers. They have now been educated to know that the Aletia propagates in certain quite well-defined centres earlier in the season, and that if taken in July (or about five weeks earlier than they had been accustomed to), they can prevent their spreading to larger areas. Now, too, they dilute the Paris green with flour and finely-sifted wood ashes, greatly reducing the cost of the poison per acre. At the same time the acreage or area to which poison is now applied has been reduced tenfold, at least. For example, here in the Red River Valley, for 30 miles up and 50 miles down the river in July there were only two plantations (together about 2,000 acres) upon which Aletia was found. In August this brood would have spread over almost the entire section mentioned. Paris green was applied to this limited infested area, and the larger areas saved from injury. The saving is hardly to be estimated. The above appears to me to be one of the greatest triumphs of economic entomology, and, I may truthfully say, also of my most estimable chief, Dr. C. V. Riley."

With regard to another injurious insect, the following facts well illustrate what may be done by following the advice of an experienced entomologist.

During the year 1885 the Hon. Moses Fowler, a wealthy banker and landowner of Lafayette, Indiana, applied to Prof. F. M. Webster, an agent of the United States Department of Agriculture, then located at that place, for relief from very serious depredations by an unknown enemy to his corn, which was damaging some of his fields from 5 to 75 per cent., he having this year 10,000 acres of land devoted to this crop. Upon examination the depredator proved to be the well-known corn-root worm, the larva of *Diabrotica longicornis.* Mr. Fowler estimated the loss in his fields by reason of this insect at $10,000, with a probability of still greater injury the following year. On the advice of Mr Webster, the next season he sowed 5,000 acres of the worst infested lands to oats, and the following year the other 5,000 acres was treated in the same manner, the first 5,000 acres being this year again devoted to corn. As a result of a continuation of this rotation the pest has been practically exterminated, thereby, according to Mr. Fowler's estimate, saving him $10,000 per annum.

Professor Osborn has shown that grass insects destroy much produce. He estimates that the small leaf-hoppers (*Jassidæ*) destroy as much food from two acres of pasture as would feed one head of stock. From recent experiments he has found that it is possible by the use of hopperdozers to reduce the numbers of these insects so materially that, upon two plots, chosen for their similarity of the conditions of the growth, the amount of hay produced upon a plot which was once treated with the hopperdozer was 34 per cent. greater than upon the corresponding untreated plot.

I have said that the study of economic entomology is many sided and requires many workers. It is equally true that all who would keep up with the rapid development which is going on all the time must work day and night, early and late. The various habits of so many different objects of study, many of them nocturnal, require constant attention.

In conclusion, I would urge on everyone the great importance of keeping the most careful notes of everything which affects their work, not only of what is seen in one's own investigations, but of whatever is found in the literature of the different subjects studied; there is perhaps no detail of our work which so well repays the slight extra trouble which it involves as making all notes carefully, completely and neatly, and then putting them away systematically, so that they can be found when required suddenly on some future occasion. Our "private notes," as we call them, should, I think, be made with the greatest possible care, not only for our own sakes, but to insure that they may be. of use to others after we are gone. Who has not felt the disappointment on looking through the collection of some great worker suddenly called away from this life, of finding rare and interesting specimens, without a single note of locality, date, or other information, and how comparatively useless such specimens, and even the labor by which they were bred or procured, are thus rendered. We all know this, and yet how, too often, do we put aside material without labels, thinking that we know and shall remember all about them. After many years of much wasted labor I have come to the conclusion that a few specimens well preserved, properly mounted, and with full notes, are far more valuable than a large number of specimens without these characters.

When a collector once gets the habit of accumulating a large number of specimens of everything he sees, he very soon gets careless about putting them away while they are in good condition, and has not time to make the proper notes.

Not only should notes be taken of what we ourselves have seen, but much time will be saved if an index book be kept of all literature which passes through our hands. Even in this we must protect ourselves. The time of an enthusiastic entomologist is necessarily short, and he has not time to " look through " books on his work to see if they are good, with the idea that he will remember where to get the contained information at some future time. All reading must be done earnestly and keenly as though we should never again have an opportunity of seeing the book in question. Let all our labour be work, not play. I think it is John Ruskin who defines work as systematic effort with a definite end in view, while unsystematic effort, no matter how severe the labour may be, if it have no definite end, is merely play. In the index book should be entered a reference to the page where any facts which strike us as useful are to be found Some restraint will be necesaary, when this work is once taken in hand systematically, not to index what is not useful, as well as that which is. It is very easy to get a mania for indexing, and then the gems we are picking out may soon be lost amongst less valuable matter. Whatever we have to read or whatever we have to see, let us give it our fullest possible attention with the idea that at some future time the information may be useful. A tale that is told about Henry Ward Beecher illustrates this very well, and is probably known to many of you. Upon one occasion he was driving in the country and his horse cast a shoe. He had always made it a rule of his life that whenever he had to see anything done he gave it his fullest attention, with the idea that at some time he might require the knowledge so obtained. He had frequently stood by whilst his horse was being shod, and consequently, when after a time, he reached a country village and found that the smith was away from home, the tale goes, he felt so confident of the knowledge he had acquired from watching carefully other horseshoes made that he lighted the fire, fashioned and finished a shoe, and shod his horse. He drove on about ten miles and reached another village. Upon passing the forge of the village blacksmith he thought it wise to have his work examined, so went in and explained the circumstances and asked the man to see if all were well. The smith looked critically at the shoe, examined it from every point of view, looked at the nails and the way in which they were clinched, and then raising himself up, said : " Look here, mister, if you made that shoe yourself and put it on, as you say, you had better give up preaching and take to smithing."

Gentlemen, I thank you for the kind hearing you have given me, and I trust we may have a pleasant and useful meeting.

Mr. Osborn, in discussing the address, thought that the subject suggested by the President, of the great importance of careful statistics, could hardly be overestimated. He moved the appointment of a committee of three to operate with Mr. Fletcher to prepare, if possible, some careful statistics as to the amount of insect damage, and as to the benefit resulting from the work of economic entomologists.

Mr. Riley indorsed the suggestion. He had been greatly gratified with the address and with the many valuable ideas which the president had put forward. Most entomologists who had treated of the losses occasioned by insects to agriculture have followed in the wake of Walsh, who had stated a quarter of a century ago, upon general estimates that the annual loss from injurious insects in America was $300,000,000. Since his time the values in crops had greatly increased and the proportionate injury should have also increased ; but we must take into consideration the advance in economic entomological knowledge, which has greatly reduced the proportionate loss. The loss is at most a relative thing, and we must always remember that with a decrease in the amount of the crop its money value is correspondingly increased. The present year is an exception, and we have abundant crops in this country with high prices as a result of failure in other parts of the world. He hoped that Mr. Osborn's motion, which he seconded, would be adopted, and he felt sure that such a committee would accomplish good results.

Mr. SMITH spoke of the unreliability of the testimony of farmers on the question of insect damage, and adduced as an instance the fact that this year the Melon Plant louse is very abundant in New Jersey, and that all melon injury is attributed to this insect, but upon careful examination the main trouble is found to be a bacterial disease.

Mr. WEED spoke in the same line, and stated that in Mississippi great damage was attributed to the Boll Worm of Cotton, which was not done by this insect, a number of species uniting in producing it.

Mr. POPENOE had found a similar misapprehension with regard to affairs in Colorado, and damage to the potato crop by the Colorado Beetle was laid at the door of the locust so abundant there, *Dissosteira longipennis*.

Mr. FLETCHER was of the opinion that the statistics should be gotten up by the entomologists themselves by the most careful personal examination and without reliance upon the statements of farmers.

Mr. SMITH called particular attention, not to the confusion of the damage done by different insects, but to the confusion of insect damage with that brought about by fungus or bacterial disease.

The motion was put and carried, and the President appointed Messrs. Riley, Osborn, and Smith as the committee.

On motion of Mr. HOWARD it was resolved that the committee be authorized to publish their results in case sufficient data for publication should be collected before the next annual meeting.

The SECRETARY reported that the minutes of the last meeting had been published in No. 5, Vol. III., "Insect Life"; that the past Secretary had transferred the treasury to him with a deficit of 38 cents, and that he had been at some expense for circulars, postage, and posters.

On motion of Mr. COOK, a tax of $1 was levied on each member present.

By vote of the Association, Dr. James Stimson, of Watsonville, Cal., was elected a member. The credentials of Mr. H. E. Weed, of Mississippi, were presented by Mr. Fletcher; those of Mr. F. L. Washburn, of Oregon, by Mr. J. B. Smith; those of Mr. J. W. Toumey, of Arizona, by Mr. Weed; those of Mr. F. H. Chittenden, of the Department of Agriculture, Mr. A. B. Cordley, of the Department of Agriculture, and Mr. F. J. Niswander, of Wyoming, by Mr. Howard. All were inscribed as members of the Association. Mr. A. S. Olliff, of Sydney, New South Wales, was inscribed as a foreign member.

A communication was read from Mr. Forbes concerning the desirability of holding the meeting of 1893 with the Columbian Exposition at Chicago. Action upon this communication was deferred.

On motion of Mr. SMITH, it was resolved that all insecticide papers should be brought together on the programme for Tuesday afternoon.

DESTRUCTIVE LOCUSTS OF NORTH AMERICA, TOGETHER WITH NOTES ON THE OCCURRENCES IN 1891.

BY LAWRENCE BRUNER, LINCOLN, NEBR.

In introducing this subject it is my intention to speak shortly upon the various species of locusts which have appeared in injurious numbers within the limits to be designated with each species. Some of these species have covered a vast area of territory, and have caused extensive injury from time to time, while others have appeared over limited areas and have caused but slight injuries; yet these injuries have been sufficient to necessitate their mention among the destructive species of the country. Taking them all together we have exactly twelve destructive locusts within the territory designated.

Selecting the species as they occur to me, I will mention first the Long-winged Locust, *Dissosteira longipennis.* During the early part of July reports came from the eastern and south-eastern portions of Colorado of locust depredations. The first of these was that trains had been stopped by grasshoppers getting on the rails of the Santa Fé Railroad 100 miles or thereabouts east of Denver. Shortly after this reports appeared in the newspapers of serious damage being done around the point where they were first mentioned as stopping trains. About this time other reports of depredations came in from North Dakota and Minnesota and other portions of the West and North-west. On the strength of these reports Professor Riley instructed me to visit the localities for the purpose of ascertaining the extent of country over-run, the actual and possible future injury which might result, and the exact identity of the species concerned. Being a Nebraska man and looking out for first interests, I naturally went to Colorado, the nearest locality to my home from which reports had been received. I first visited Akron, Colorado, the nearest point on the Burlington and Missouri line to the region infested. There securing a team and driving to the south only about six miles, the advance guard of the enemy was encountered. Imagine my surprise at finding here an entirely new insect as far as destructive locusts are concerned. Here in Colorado, and in immense numbers, was the *Dissosteira longipennis*, an insect usually considered rare in collections, and one heretofore only known to occur over the higher portions of the plains lying to the eastward of the Rocky Mountains, in the States of Wyoming, Colorado, and New Mexico. This insect, as ascertained from inquiry, covered an area of about 400 square miles of territory in sufficient numbers to materially injure the grasses growing on the ranges of the entire region, and amongst these grasses the species of *Bouteloua* or Gramma grasses, and the Buffalo grass, *Buchloe dactyloides.* Grains and other cultivated plants did not appear to be especially attractive to it. In fact very little or no injury was done by it to the cultivated crops growing within the region infested. About the same time that I was investigating this insect upon its northern line of injury, Professors Snow and Popenoe were studying it upon the southern border of its range, and they found practically the same food habits there that I had noted in the north, and by inquiry found that the insects had come into that country from the south last fall and had laid their eggs over a large area. This year when the eggs hatched, the young began to move from their breeding centres in all directions, seeking open places and the edges of plowed fields and following roadways. This trait of seeking open spots this season is probably due to the habit of the insect of naturally living on open ground, where grasses are short and scattering. The present year was very wet in this particular region and caused an undergrowth of grasses; hence the desire to find the natural conditions under which the insect lives. The young began moving, and, finding these open places, congregated there. Having thus congregated, they must naturally feed, and they swept the grasses clean around these spots. So noticeable was this that, in certain spots where they had gathered about the hills of a species of ant which raises mounds of small gravel and cuts away the vegetation for some distance around them, they had enlarged these areas in some places for fully half an acre. This year Messrs. Snow and Popenoe observed them flying southward with such ease, by reason of their long wings, that they resembled birds.

Dissosteira obliterata, Thomas.—Closely related to the above, and very similar in appearance to it, is a second species of these large, long-winged locusts, which was found in injurious numbers along with *Camnula pellucida* in Idaho last year. It was quite common in the Wood River country lying north of Shoshone and in the vicinity of Boisé City, Idaho. One form of this species was described by Saussure as *Dissosteira spurcata* in his *Prodromus Œdipodorum.* This is not the *Œdipoda obliterata* of Stoll.

Camnula pellucida.—This is the insect which has occasionally been very destructive in parts of California and Nevada. It has since spread eastward into Idaho, where it is very destructive the present season, covering an area of at least 1,300 square miles of territory. It also appears in great numbers, with several other species, in the Red River Valley of Minnesota, North Dakota, and Manitoba. I also observed it abundantly in the Prickly Pear and Gallatin Valleys of Montana, near the mouth of the Yellowstone, in North Dakota, in portions of Wyoming, Colorado, and the extreme western part of Nebraska. It also occurs in the New England States and British America. This is a species which readily adapts itself to any new locality, being the most easily acclimated of any of our injurious locusts. When once domiciled, it is there to stay, and will require our earnest attention from time to time in the future. In fact I consider this locust, though not migratory, fully as destructive as the Rocky Mountain or true migratory locust, from the fact that it so soon becomes acclimated.

Acridium americanum, Drury.—This large, handsome locust is the species which occasionally devastates Yucatan, Central America, and Mexico, and even reaches the United States in injurious numbers along our southern coasts. It has also been known in dangerous numbers as far northward as the Ohio River, and occurs sparingly as far north as the northern States, but I imagine never reaches British America.

Dendrotettix longipennis, the Post Oak Locust of Texas.—During the spring of 1887, while visiting Washington County, Tex., to investigate a local outbreak of an injurious locust, I heard of a species that was attacking the oaks of that particular region, and in some places entirely defoliating them. On my way from the region where I had been working to the city of Brenham, we passed through the infested locality, and I obtained some of the insects in question, which were then in the larval stage. A careful examination proved the insect to be new and congeneric with a species heretofore collected only in the vicinity of St. Louis, Mo., and which also occurred only on oak. About a year later this species was described by Professor Riley under the above name. The insect occurs in two forms, long-winged and short-winged. The former flies with great ease and often leaves the trees in midday and alights in fields and other clearings; with the least disturbance it flies to the tops of the adjoining trees. The larvæ and pupæ are also exceedingly active and run over the branches and trunks of trees with great rapidity. The eggs are laid in the ground around the bases of the trees. An area of at least 50 square miles of forests was completely defoliated by these insects during that and the previous year.

Melanoplus spretus, Thomas, the Rocky Mountain or Migratory Locust. This is the insect which is generally referred to as *the* destructive locust of North America, and has caused more injury during the past 20 years than any dozen of the other species combined. It is this species which we most fear on account of its migratory habits; so marked is this trait that swarms hatching on the Saskatchewan have been traced to the Gulf of Mexico in one season. Its habits have been so frequently described that further mention is unnecessary. Suffice it to say that at the present time it is again decidedly on the increase along our northern boundary. During the present year reports of its injury were received from Minnesota, North Dakota, and Manitoba by the Department of Agriculture, and upon investigation I found these reports to be only too true. In Minnesota and Dakota the authorities, ably assisted by the efforts of settlers, have been carrying on a vigorous warfare with marked results, which will doubtless save their crops from devastation next season.

Melanoplus atlanis, Riley, the Lesser Migratory Locust.—This locust, which very frequently becomes very injurious on account of its excessive increase, is somewhat smaller than the Rocky Mountain species. It is also migratory in its habits, but to a much less degree than is *spretus*. In its distribution this insect is much more widely spread than the preceding, being common in almost all parts of our country from the Mexican boundary to the fifty-third degree of north latitude, and even beyond in some parts of the country. It is the species which most frequently does the locust injury in the New England States, much of that in our Northern States, and some in the extreme Northwest. It has also been known to become injurious even in the Middle or Southern States. In its distribution *atlanis* appears to be more partial to hilly or mountainous country, and especially is this noticeable in reference to its appearance in destructive numbers. It also seems to prefer wooded or mixed country to the open prairie or plains.

As would naturally be expected from its wide distribution, this particular locust presents some variation in its size, color, and, to some extent also, its structure. At any rate there appear to be three well-marked forms of the species to be met with within the confines of North America.

Melanoplus devastator, Scudd.—A third species of the genus Melanoplus is the one that occasionally appears in destructive numbers in portions of California and the adjoining States. It is about the same size as the *atlanis* just mentioned, and often does considerable injury to the crops of the regions where it occurs. Although this locust is known to inhabit almost the entire region lying to the west of the main divide of the Rocky Mountains and to reach even beyond in Montana and Colorado, it has never, to my knowledge, been injurious except in Nevada, California, Arizona, and Oregon. This species also occurs in two forms, viz., small and large, being the spring and fall broods as nearly as I have been able to decide from specimens in collections.

Melanoplus bivittatus, Say, the Two-striped Locust.—This is our common species of native grasshopper all over the country, and the one that so frequently becomes injurious in our gardens and about the edges of fields. It occurs from the Atlantic to the Pacific, and from the Gulf of Mexico to the Saskatchewan. Its increase in destructive numbers appears, however, to be confined chiefly to the regions lying between the Rocky Mountains and the Atlantic. This locust also appears to vary considerably in its size and colour. There are, however, two well defined forms, the one receiving the name *bivittatus* and the other going by that of *femoratus*, the latter occurring only northward.

Melonoplus differentialis, Thomas, the Differential Locust.—Next to the species just mentioned we frequently find a second species of our large native locusts appearing in destructive numbers. This latter species occurs in the Western and Middle States only, and here is very often known to become unduly numerous and destructive to both the field and the garden crops. It has been reported at different times to have been present in such numbers in portions of Illinois, Indiana, Missouri, Kansas, Iowa, and Nebraska. A melanic or black form is quite frequent in portions of Nebraska and Kansas, but otherwise it is quite permanent in its character.

Melanoplus ponderosus, Scudd., the Ponderous Locust.—An insect very closely related to the preceding is that known to the entomologist by the above name. It is a native of several of our southern states, and has on several occasions been a depredator of crops in portions of central Texas. As the name would imply, it is of robust form, and has a somewhat similar appearance to the *differentialis*.

Melanoplus femur-rubrum, De G., the Red-thighed Locust.—Last on the list of destructive locusts for North America north of Mexico, is herewith presented the one that perhaps enjoys the greatest geographical range of all our species. It is the common locust in all parts of the country from the Atlantic to the Pacific and from the Arctic circle to Central America. Its devastations, while perhaps not as vast as some of the preceding, have been more frequent and have occurred at more localities than those of any other one. Like the *bivittatus*, *differentialis*, and several of our non-destructive species, *femur-rubrum* is a frequenter of rather low places and rank vegetation.

After giving these brief notes on the various species of locusts that have been known in the past to have been connected with the injuries from this class of insects within the country, it will not come amiss for me to say a few words about the subject for the present year, and to give my opinion as to the probable outlook for the coming year. Briefly, then, let me say that there have been received reports of locust injury from the following states :—Alabama, Mississippi, Texas, New Mexico, Arizona, California, Idaho, Colorado, Kansas, Nebraska, North Dakota, Minnesota, Iowa, Indiana, Ohio, Michigan, and New York. In fact, there have been more separate reports received the present year than ever heretofore from this cause.

Now a word or two as to the different species of these destructive locusts that are responsible for the injuries of the present year. In California the *devastator* is present ; the *Camnula pellucida* is known to be unduly common in Idaho, Minnesota, North Dakota, and parts of the Rocky Mountain region ; the Rocky Mountain or migratory locust is the one that is responsible for much of the injury that has been reported from the Red River Valley of Minnesota and North Dakota as well as in Manitoba to the north of the international boundary ; *Melanoplus differentialis* is the one that must receive much of the blame for Kansas and Nebraska injury, while in the states of Indiana and Ohio *femur rubrum* and *bivittatus* are the guilty parties. *Melanoplus atlanis* is present in injurious numbers in the Red River Valley along with *bivittatus*, *spretus*, and the *Camnula pellucida*. In Colorado and New Mexico for the first time *Dissosteira longipennis* has appeared as one of the injurious species of the country.

While all of these locusts, along with almost every other species of the group which is native to North America, are to be counted as injurious, the particular one that has been the dread of the whole country, and especially of the region lying between the Mississippi River and the Rocky Mountains, is the migratory species—*Melanoplus spretus*. This insect is now on the increase in a limited area on our northern boundary and across the line in the province of Manitoba. By continuing the prompt and energetic efforts that are being carried out by the populace and state authorities of the states of Minnesota and North Dakota we can be assured of success only provided the Canadian government will also see the advantage of co-operation at this time. This, let me state, is all the more necessary at this particular time, as all reports seem to indicate that at present this locust is not present in abnormal numbers in any other part of the entire country. A stamping out of the pest in this region might, therefore, forever give immunity from their further injury.

Finally, let me urge on the inhabitants of all infested regions that " a stitch in time saves nine." In other words, we do not know what the climatic conditions may be a year hence—whether they will be such as to favor the hoppers or not—so we should do the wise thing and stamp out the pest. This has been done time and again in the past, and the recent work in the north shows how very profitable is the warfare when carried on persistently. By the plowing under of the eggs laid last fall, and the use of the kerozene pans or hopperdozers in the destruction of the young locusts that did hatch, the twelve counties in the two states of Minnesota and North Dakota saved, by actual computation, on wheat alone, the sum of $400,000 This, mind you, was in a year not considered a locust year, and does not take into consideration what was saved in the region in other crops and the injury that might have resulted next year had the hoppers not been destroyed. With every favouring circumstance, the comparatively few locusts of this one species that have thus far been destroyed the present year in this region would have been sufficient to overrun, at least calculation, the entire area of the state of Minnesota, the two Dakotas and Nebraska, along with portions of Iowa and Kansas. True, these favouring circumstances might never occur, but it is always best to be on the safe side. This we should know from our past experiences with this same insect.

"Native" locusts, while perhaps not to be dreaded equally as much as the species just spoken of, certainly can commit an equal amount of injury when size and numbers of the insects are taken into consideration. They cannot, it is true, get up and fly away to regions new, but they are equally rapid breeders, with favouring conditions They can be destroyed equally as well, if not better, than can the Rocky Mountain species, on account of their local restrictions, even in the regions where found.

Mr. Southwick had noticed *Melanoplus femur-rubrum* flying to the tops of grasses towards sunset in the fields near New York City.

Mr. Osborn had noticed the same habit. He spoke of the great difficulty of estimating the damage done by grasshoppers. Some discussion followed upon this point by Messrs. Southwick and Atkinson.

Mr. Cook stated that *M. femur-rubrum* had been very abundant in Michigan for three or four years back, but that he had no difficulty in estimating the damage to oats. He thought that the outlook in Michigan was not at all serious, and considered that perhaps Mr. Bruner's prediction was too doleful.

Mr. Bruner stated that we cannot take any chances. The black picture is justifiable if we make people work to destroy the insects and the local species have it in their power to become serious pests.

Mr. Webster stated that *femur-rubrum* is the species which is doing the damage in Ohio. He had noticed a fungus parasite working to a considerable extent near Columbus.

Mr. Smith thought that Mr. Bruner's point that it is unsafe to predict comparative immunity on account of a tendency of farmers to shirk work was a very good one.

Mr. Cook stated that there was another side to be considered, for if the entomologists predicted danger and the farmers did no work and the plague did not come, the entomologists would be forever discredited.

Mr. Weed spoke of the cotton worm, and stated that where the planters were always ready with their stock of Paris green they were in condition to fight the worm whenever it appeared in numbers.

Mr. Webster thought it was always best to tell the truth and to frankly admit all inability to give valid predictions.

Mr. Fletcher was of the opinion that in all probability predictions can be made more confidently in the western country worked over by Mr. Bruner than in Canada and the region spoken of by Professor Cook.

CHILO SACCHARALIS IN NEW MEXICO.

BY C. H. TYLER TOWNSEND, LAS CRUCES, N. MEX.

On July 8, 1891, I found a considerable number of stalks of young corn on the college farm infested with a borer. The borer enters by a hole in the stalk a short distance above the ground, and bores down into the root. It makes its burrow exactly down through the centre of the stalk, and some go upward a considerable distance also. The infested stalks are easily known by the tassel and most of the top being entirely withered and white or yellow. Some stalks showed the work of more than one borer evidently, unless the same one had eaten out and then eaten in in other places In several stalks the live chrysalids of the borer were found near the bottom of their burrows, in the root, about even with the surface of the ground. From these pupæ two of the moths were bred, issuing July 12th. Sorghum grown near the infested corn on the college grounds could not be found infested by the borer. The same borers were sent to the college from Eddy, New Mexico, with report of much damage to corn. In many cases on the college farm the chrysalids were found dead and decaying in the burrows in the stalks. A dead larva was also found some distance above ground in a stalk. More dead pupæ than live ones were found, and probably this is the result of irrigation, which makes it too damp for the pupæ lodged in the roots and engenders disease.

In discussing the paper Mr. Weed said that this insect damaged corn to some slight extent in Mississippi, and considerably more so in Louisiana.

Mr. Howard said that this species is spreading northward rapidly through the Southern states and has reached the southern border of Maryland, but that it is not a pest to be feared with the methods of careful cultivation in vogue at the north.

A NOTE ON THE WHITE GRUB OF ALLORHINA.

BY C. H. TYLER TOWNSEND, LAS CRUCES, N. MEX.

On the 30th of April, 1891, I had a spot of ground on Judge Wood's place, near Mesilla, dug into for white grubs. The particular spot dug into was selected because white grubs had been found in it before, although I was assured by Judge Wood that not a particle of vegetation, not even a weed, had grown on it for at least three years, and probably four. It was a bare spot in the back yard, and by digging over a square foot or two of ground sixteen grubs were secured, at from six to ten inches below the surface. These grubs were all about the same size, and apparently nearly full grown. The ground contained no roots of any kind, but their food habits in this barren soil were explained in this manner: They were left over night in a tin can in earth in which was also placed an elongate white larva about an inch and a half long that had been found in the earth at the same time with the grubs. The next morning nothing but the caudal extremity of this larva could be found; the white grubs had devoured it. If this carnivorous habit is known of *Allorhina* I am not aware of it. I know that some other Scarabaeid larvæ have been found occasionly carnivorous. But *Allorhina* I had supposed lived only on roots of grass or other plants.

There is no complaint in this country of injury to roots of alfalfa or grasses by white grubs, yet the adults swarm in the summer and destroy much fruit, and the ground is full of their grubs.

Ten of the above grubs were placed in a jar of earth to breed. On July 24th, 1891, two imagos of *A. nitida* were found in the jar on the surface of the earth.

Mr. Alwood stated that he had bred a dipterous parasite from the adult of *Allorhina nitida.*

Mr. Marlatt thought that this instance of Mr. Townsend's was interesting, but that it proved no general habit. He considered that the ground was probably rich in vegetable matter so as to afford food for the white grubs.

Mr. Smith thought that it would be interesting to know what the other larva fed on.

Mr. Popenoe expressed himself as surprised at the extreme south-western distribution of the species.

Mr. Marlatt then read a third paper by Mr. Townsend.

NOTES OF INTEREST.

BY C. H. TYLER TOWNSEND, LAS CRUCES, N. MEX.

A specimen of the Colorado Potato-beetle (*Doryphora 10-lineata*) was taken July 12th, 1891, on our common wild purple-flowered *Solanum* here. It is the only specimen I have seen here.

The Bean Epilachna is in full force on the college farm. All stages, from eggs to adults, found last of July. Some experiments in spraying with Paris green were tried. The results up to August 1st were negative, neither the insects nor the plants being killed. The solutions were purposely made very weak.

The latter part of July, 1891, the Bollworm (*Heliothis armigera*) was found in nearly every ear of corn in a patch on the college farm. They were of all sizes and colours, and were accompanied almost invariably by large numbers of Coleopterous (Elaterid ?) larvæ, which seemed to work entirely independently of the worms, and bored all through the ripening kernels, doing much destruction.

A leaf-miner was found on the vine during June, 1891, but was not bred. It mines the substance from between the two skins of the leaf, and its gallery may be seen plainly, with its small grub at the terminus of it.

On the 15th of June, 1891, I found a rather large number of adults of a Rose Chafer (*Macrodactylus* sp.) on the leaves of the vine in the vineyard about a mile from this place. They had eaten the leaves very badly and were nearly all *in coitu*, but were found on only two or three vines. They soon afterward all disappeared.

A leaf miner on the cottonwoods here (*Populus fremontii*) annually destroys the whole first crop of leaves on nearly every tree in the valley. April 30th, 1891, nearly every cottonwood presented a thoroughly blistered appearance, caused by the inside of almost every leaf on the tree having been entirely eaten out, leaving the blistered-like skins of the leaves alone on the trees. This appearance continued for a couple of weeks until the trees gradually put forth a whole new crop of leaves. The second crop of leaves was but little infested this year, though I am told that in some years they also are nearly destroyed. I was unable to breed this miner.

The vine-leaf hopper has been studied. Eggs deposited singly, last of April, beneath skin of leaf, marked by a minute globule of exuded sap. Hatched last of May or first of June. Kerosene emulsion on the young hoppers, diluted fifteen times, proved effective; I. X. L. compound only partially so.

Owing to a misunderstanding of one of the names in this paper a slight discussion on the habits of *Aleochara* followed.

Mr. Schwarz considered the larvæ of these beetles not to be true parasites, but simply predatory.

Mr. Fletcher had bred larvæ of this genus from puparia of the cabbage maggot, in which no holes of egress or ingress could be discovered, and considered them to be true parasites.

Mr. Schwarz said that Mr. Coquillett had noticed the larvæ of *Aleochara* enter the puparia of *Anthomyia*, and stated, moreover, that the beetle larva has no approach to the parasitic habitus.

Mr. Southwick mentioned the occurrence of mites upon *Scarites subterraneus*.

Mr. Webster mentioned the abundance of *Uropoda americana* at Columbus, on *Diabrotica* and a large number of other insects.

Mr. Alwood and Mr. Atkinson spoke of the abundance of beetle mites in their localities.

NOTES ON BLACKBERRY BORERS AND GALL MAKERS.

BY JOHN B. SMITH, NEW BRUNSWICK, N. J.

Blackberries are raised in New Jersey on a very large scale, and near Hammonton, in Atlantic County, several hundreds of acres are devoted to this fruit. After many trials the "Early Wilson" was selected by growers as the most satisfactory variety for size, flavour, date, and shipping qualities, and it forms the bulk of the crop. A few other varieties are raised to extend the season ; but the "Wilson" is the staple. Unfortunately it adds to its many excellent qualities that of extreme susceptibility to insect attack, and of all the varieties grown in New Jersey this only is killed down in a few years unless carefully looked after.

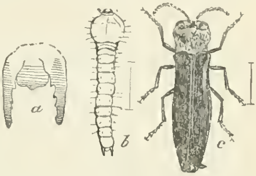


Fig. 10.

I began my studies on the insect pests of the black berry in the early part of the present year, before yet the canes had begun to leaf out, and found that all the pests infested cane or root.

One of the chief pests is the well known *Agrilus ruficollis*, or red-necked blackberry cane borer (Fig. 10). Its life history has been worked out by others, and I have nothing of any importance to add. The well-known galls (Fig. 11) usually indicate the position of the borer, and how to get rid of it is the question. I say the galls *usually* indicate the position of the borer, because, though there can be no gall without a borer, we can have a borer without a gall. If a gall be split the length of the cane it will be seen that the wood is not involved in the gall growth, but only the bark. The insects emerge from the canes in early summer, May 25 to July 10, the month of June being the time of greatest abundance. The egg is laid by the female at the base of a leaf stalk, and I believe it is not thrust into the tissue, but is simply laid at the base of the stalk or in the bud there starting. It was not until late in July that any larvæ were found. The first sign of their presence was a dead bud at the leaf axil, and where the stem was carefully examined almost every dead bud showed traces of having been eaten into, the minute and very slender young larvæ being found under the bark near by.

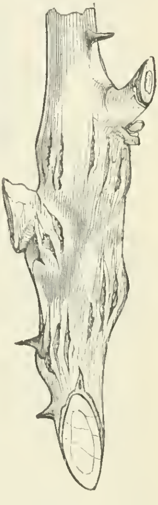


Fig. 11.

Usually they run up the main shoot; but where laterals have become well developed they often go into these, especially where more than one egg was laid in the same place. In neglected fields, often as many as three eggs may be found at a single point, and five leaf axils may be infested on a single stalk. The young larva bores upwards in a cork screw channel in the sap wood, until early August. Some are at that period only one fourth of an inch long and almost nothing in diameter, while others are half an inch in length and reasonably stout. Sometimes a larva will make only two or three long circles around the cane and then, while yet minute, will pierce the cane and get into the pith. Where this is done, no visible gall forms. Others, however, and usually those in large, stout canes will circle the stalk half a dozen times or more in succession, the girdles not more than one-eighth of an inch apart. The first trace of a gall I found in early August, when a slight ridge appears over every larval gallery, so that the course of the borer is perfectly traceable on a smooth stem. As the cane grows the sawdust and excrement in the galleries seem to swell and enlarge and also to destroy the vitality of the tissues around it, until instead of the girdlings becoming smaller, they really become more prominent, and the abnormal growth of tissue continues. In some cases, as stated, no galls appear ; but this is somewhat exceptional. In raspberry I have not found the galls, while borers have been found not rarely. This indicates that some of the exempt varieties of blackberries may simply form no galls. I am the more inclined to believe this, because I have seen beetles in no small numbers in "exempt" fields. I believe, too, that killing the cane is due, not to the injury in the pith, but to the injury done under the bark. Beyond this, the history of the insect is well known ; but I am not aware that the gall formation has been as fully observed. Of course the remedy is obvious. Cutting the galls out thoroughly in early spring and burning the cuttings is certain. This is already practised by our best fruit growers, and they are not much troubled. Unfortu nately there are many who seem unable to understand their own interests, and will delay cutting or refuse to burn. Some fields, too, belong to men of other occupations, and as they become unprofitable, they allow them to go to ruin and to become breeding places for all sorts of pests, fungus and insect.

Next in order, and indeed sometimes even worse, is the larva of a Sesiid, probably *Bembecia marginata*, Harr. The eggs of this insect, which I have not yet seen, are laid late in August or in September. The young larva hatches that same fall, and in the following spring is found in canes of the previous year's growth, boring only a short distance up from the roots. It is then less than half an inch long and of a faint reddish tint, which it loses as the summer advances. In July it leaves the cane on which usually no fruit has set, and attacks a new shoot, eating around the base and burrowing up between bark and wood. The shoot wilts, but the larva seems not to travel more until the following spring. It is then an inch long, white in colour, and with a brown head. It eats at the crown until the new shoots are large and vigorous, and early in July the wilting shoot in infested fields indicate the whereabouts of the larvæ. They pupate in August, one pupa newly formed being found on the 10th, and a number on the 23rd, but at these dates no imago was yet noticed. One pupa had wriggled out through the stem at the latter date, apparently ready to transform. The insect is important because it cuts two year's growth of infested hills. The remedy is also mechanical. It consists in cutting the shoots as they wilt close to the crown, and destroying the contained larvæ.

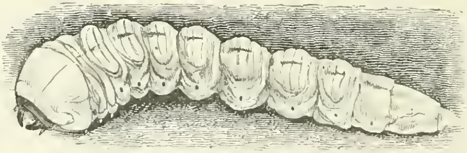


Fig. 12.

Sometimes in June a hill will suddenly wilt and die as if burnt. Search will in all cases reveal an enormous longicorn larva, (Fig. 12) which I make out to be that of *Prionus laticollis* (Fig. 13). In some old fields it is very mischievous, boring huge channels in the main root. I am not aware that this has been heretofore noted as infesting blackberries, and simply record the habit.

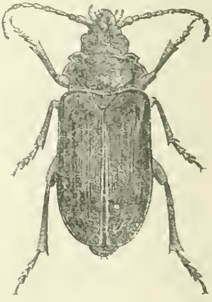


Fig. 13.

Another insect infesting growing canes escaped me during the present season because unexpected and unnoticed In cutting some new shoots I found them marked, through the pith from base nearly to tip, a distance of three or four feet, by a larval channel. The new canes had been already topped a first timeand I missed the culprit. In some fields not yet topped I found that the borer had emerged or had been parasitized, fragments only remaining, which seemed to prove it Lepidopterous. No apparent damage was done by the insect and none of the bored stems died.

A little gall on young shoots, found very locally only is formed by a *Cecidomyiid* very near to *Lasioptera farinosa*, if not identical with it. The young shoots are always trimmed out before the imago emerges in spring, and no damage is done. The larva is also parasitized quite frequently, and only a few imagos were obtained. The relations of the parasites to each other are still somewhat obscure, and one of the species may be secondary.

AFTERNOON SESSION.

Meeting called to order at 4 p.m. by President Fletcher ; 29 persons were present.

THE SQUASH BORER, MELITTIA CUCURBITÆ, AND REMEDIES THEREFOR.

BY JOHN B. SMITH, NEW BRUNSWICK, N. J.

The most dangerous enemy to squash culture in New Jersey is undoubtedly this borer. Its life history is already fairly well known, and the question of remedies is the vital one. Those usually recommended have not proved eminently satisfactory in practice, and cutting out is still most generally relied upon. Summer squashes are badly infested, but have a large stout stem and usually mature a crop before the borers can kill the vine. Of the later varieties the Hubbard is the favorite, not only of the grower but of the borer. The missing links in the life history seemed to be in the egg stage, and these were carefully observed by me during the present season. I found in every case one or more eggs at the base of the plant, as near to the root as possible, and usually on the underside of the stem, *i. e.*, that portion of it resting on the ground. The moth evidently gets as near to the base of the plant as possible, and deposits her eggs as far towards the root as her ovipositor will extend. Rarely the egg will be found at the axil of the first or second leaf stalk ; but it is at such points that the insects rest at night. The egg itself is chestnut brown in colour, in form a flattened disk and of quite large size. The shell is quite hard and chitinous, but brittle. It is not readily pervious to the kerosene emulsion diluted 12 times, but is readily crushed. This stage is quite a protracted one, lasting at least 12 and probably often 15 days. The young larva when it leaves the egg moves off less than an inch and immediately enters the stem. This habit accounts for the ill success of the arsenical mixtures applied to the stem. The difficulty of getting all around it is great in the first place, and the larva eats so little that it has at least an even chance for escape. The kerosene emulsion might be more satisfactory but for the difficulty of getting the application on the under side of the stem. When the egg-laying habits were observed the experiment patch was examined, all the spare vines pulled up so as to verify the universal presence of eggs, and then with the fingers the bases of the vines were rubbed thoroughly. This was intended to crush the eggs, and it was effective. The process was twice repeated, and two or three larvæ only escaped. The other vines continued healthy and free to date. Where planting can be deferred to July the vines will be free from borers, and this is the plan adopted by some large growers In small or garden patches, rubbing the stems of the vines near the base will prove effective and is a simple and cheap remedy Planting summer squashes as traps and destroying the vines before the insects mature would also be a good way to avoid injury.

Mr. Riley asked whether Mr. Smith had tried the ordinary method of mounding the vines with ashes.

Mr. Smith said that he had not, and that he thought that this practice would simply oblige the moths to lay their eggs higher up the stalk.

Mr. Alwood said that he had found all cucurbitaceous plants quite resistent [illegible]ain the injurious effects of kerosene, and inasmuch as he had been successful against *Diabrotica* with kerosene emulsion, he thought that this substance would be available against the borer.

NOTE ON A COTTON CUT-WORM.

BY G. F. ATKINSON, AUBURN, ALA.

[Secretary's abstract.]

During the early part of July the author visited Greensboro, Ala., at the request of a cotton planter who complained that great damage was being done to the young cotton by worms. He found that an acre had been entirely stripped and had been plowed under and replanted. He found Noctuid larvæ at the roots of 20 or 30 of the plants, which he subsequently reared to the adult stage and proved to be *Agrotis annexa*. Experiments with Paris green seemed to show that this insect could be treated with this substance. He also found the [illegible] feeding on *Amarantus*.

NOTE ON A NEMATODE LEAF DISEASE.

BY G. F. ATKINSON, AUBURN, ALA.

[Secretary's abstract.]

This worm has been found by Dr. Byron D. Halstead affecting the leaves of *Chrysanthemum* and *Coleus* in New Jersey. It makes no swelling or deformity as do many other Anguillulids, but causes a brown patch upon leaves. Mr. Atkinson has determined this as a species of the genus *Aphelenchus*. He entered into some details as to the distinguishing characteristics between Aphelenchus and Tylenchus, and showed that this species is somewhat aberrant in the genus in which he has placed it.

Mr. Smith asked whether the characters of the genitalia are constant.

Mr. Atkinson replied that they are within generic limits, but that they do not differ with species except as regards the distance from the anal end of the body to the genitalia. Mr. Atkinson further stated that he thinks that these Nematodes reach the leaves by being borne up in the axils of the leaves as the plants grow.

Mr. Riley asked whether it was not possible that the young might work their way up the plants to the leaves during rain.

Mr. Atkinson agreed as to the possibility of this method, and further stated that he had received what he supposed to be the *Tylenchus tritici* or *scandens* of Europe, from grass in Colorado.

KEROSENE EMULSION AND PYRETHRUM.

BY C. V. RILEY, WASHINGTON, D. C.

In the *Rural New Yorker* of June 20th, 1891, Dr. Albert E. Menke, director of the Arkansas Experiment Station, criticises a review of Bulletin No. 15 of his station, published in *Insect Life*. The principal point raised by Dr. Menke is that kerosene extract of pyrethrum, made into an emulsion with soap and water, is entirely different from an aqueous extract of pyrethrum made into an emulsion with soap and kerosene, as recommended by Professor Gillette. He also disputes the statement that the idea of combining kerosene and pyrethrum was given him by Prof. Jerome McNeill. Prof. McNeill has experimented with both the Gillette and the Menke combinations, and in a recent communication he confirms the statement that he first suggested the combination of these two substances to Dr. Menke and gives the results of his experience as follows :

In preparing, in accordance with your directions, Dr. Menke's mixture, I used the proportions given in Bulletin No. 15 of the Arkansas Station. The extract of pyrethrum was made by simply digesting the powder in kerosene for three or four hours. The resulting emulsion is good, and it is about as effective on the Cabbage Worm as he claimed it to be on the Cotton Worm. Mr. Gillette's mixture I made with the same proportion of soap, kerosene and pyrethrum as the first mixture contained. * * * The emulsion was made in the usual manner, and then it was diluted with the kerosene tea. When Dr. Menke's mixture was diluted equally, there was no difference between the two in appearance or odor. In using dilutions of the strength, fewer worms survived the application of Mr. Gillette's solution, but the difference was immaterial, as when I applied the mixture without knowing which I was using, I could not always tell which of the two I had employed. Such in brief are the conclusions I have reached after a considerable number of experiments with the two. I shall not be satisfied, however, without further trial of these mixtures upon different worms. One thing that has disturbed my satisfaction with these experiments is, that in many cases where I had applied a dilution of a given strength to larvæ of different age, the younger larvæ seemed less affected than the older. Concerning the difference between an aqueous extract of pyrethrum made into an emulsion with kerosene and soap, and a kerosene extract of pyrethrum made into an emulsion with soap and water, there is no practical difference. It may be of some slight interest to scientific people to know that the aqueous extract and the kerosene extract are technically different. As far as their use is concerned these two are absolutely one. If there is any practical difference between them, the aqueous extract emulsion is preferable. I have never made any public claim to having originated the idea that kerosene would dissolve the insecticide principle of pyrethrum. What I wanted to announce the discovery of was, that the two insecticides, kerosene and pyrethrum, could be combined in an emulsion which would be more effective than either. When I was assured by Mr. Mally (an agent of the Division) that he had made such a mixture while working with Mr. Gillette, my personal interest in the matter ceased. Dr. Menke claims to have discovered an "entirely new" insecticide which is remarkable for its cheapness. I think I have shown that it is composed of the same materials which may be used in the same proportions, so that the difference between his emulsion and Mr. Gillette's is in method of preparation, and in this respect his method is decidedly the inferior. The chief difficulty in the use of pyrethrum in kerosene emulsion is the cost when compared with the cost of the arsenites in the form of powder or in solution.

* * * * * *

Mr. Smith had tried the kerosene-pyrethrum combination according to Menke's formula, but had found it of no use against the Rose Chafer.

In response to a question by Mr. Smith, Mr. Alwood stated that he buys imported powder for from 38 to 40 cents per pound at wholesale in New York For buhach he has to pay 75 cents per pound and considers that one is as good as the other. He finds that he can keep the powder in bulk for two or three years, with care.

Mr. Webster stated that he could buy it by the 10 or 20 pounds in Lafayette, Ind., at 30 cents per pound.

Mr. Alwood stated that in his opinion this powder must be adulterated on account of the cost of production in Dalmatia.

Mr. Smith buys in Philadelphia for 25 cents per pound.

Mr. Weed had found kerosene combined with pyrethrum perfectly useless against the Harlequin Cabbage Bug. Kerosene emulsion is also ineffective against the same insect.

Mr. Alwood, however, had found it effective for this insect.

Mr. Weed stated that he had killed the plants but not the bugs. He has found the eggs of this insect to hatch in three days in Mississippi (first brood), those of the second brood hatching in two days, and those of the later brood in four days. These periods, however, are not definite, and considerable variation occurs.

Mr. Smith finds this species in southern New Jersey, but never upon cabbages.

Mr. Doran stated that the bugs can be caught upon Mustard before the cabbages are set out.

Mr. Weed said that he had experimented in that direction and recommended the application of pure kerosene upon the first brood of bugs upon Mustard.

Mr. Bronk had traced an attack of this Cabbage Bug from Kale to Cabbage, the Kale having been destroyed and but three plants accidentally left.

Mr. Osborn said that Mr. Gillette conducted his kerosene-pyrethrum experiments nearly a year before his results were published, awaiting confirmative evidence.

Mr. Riley said that the great efficacy claimed for these combinations of Mr. Menke and Mr. Gillette will not be borne out by further experiment. Against the Boll Worm his agents have not found them thorough antidotes.

The association then adjourned.

AUGUST 18, MORNING SESSION.

The Association was called to order by President Fletcher at 9.30 a.m. Thirty-four persons were present. The minutes of Monday's meeting were read and approved. On motion, a nominating committee, consisting of Messrs. Howard, Weed, and Bruner, was appointed.

WORK OF THE SEASON IN MISSISSIPPI.

BY H. E. WEED, AGRICULTURAL COLLEGE, MISSISSIPPI.

[Secretary's abstract.]

There has been no one great outbreak the present season. Last year stock was injured by the Screw Worm quite extensively, but the planters are now treating with carbolic acid washes and are lessening the damage. The Cotton Leaf-worm and the Boll Worm are the principal insect enemies of the State. The former is only just appearing and will not be destructive. The Boll Worm was injurious last fall owing to wet weather. *Ægeria pyri* occurs abundantly in apple trees, but not in pear. *Hippodamia convergens* (Fig. 14) he has proven to be an injurious insect, as he has seen it feeding upon the leaves of cabbage. Moreover, he has poisoned with Paris green and killed the beetles. The Chinch Bug occurs in the western part of the State on corn. The cabbage crop is almort invariably destroyed by the Harlequin Bug and other insects The Plum Curculio is very abundant upon peaches. Cattle Ticks (*Ixodes bovis*) are very abundant in the southern part of the State. The emedy in use is to feed the cattle equal parts of sulphur and salt continuously.

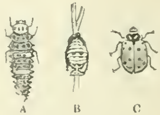


Fig. 14.

The question of the action of the sulphur was brought up by Mr. Fletcher and Mr. Marlatt, and Dr. Marx stated that the sulphur was eliminated by the sudoriferous glands, thus bringing it into contact with the ticks.

Mr. Smith considered Mr. Weed's experiments with Paris green against *Hippodamia convergens* not conclusive as indicating their phytophagic habit, as the beetles might have been feeding upon plant lice and thus have been poisoned by the Paris green.

Mr. Popenoe stated that he had found *Hippodamia* feeding upon rust spores.

Mr. Weed described the treatment of Cotton for the Cotton Worm by means of a long pole carried across a mule's back with a bag of Paris green hanging to each end of the pole. In this way four rows of Cotton can be treated at once with undiluted Paris green.

Mr. Webster stated that in Louisiana four sacks were thus strung upon a single pole.

NOTE ON THE HORN FLY IN OHIO.

BY D. S. KELLICOTT, COLUMBUS, OHIO.

Since the full accounts of the Horn Fly given in *Insect Life* and elsewhere, I, as many others, doubtless, have sought for it wherever I had an opportunity. I remember no reports of its occuring west of the Atlantic border, but it certainly has a foothold in central Ohio. During the first week of July last I found it in great numbers on the farm of Mr. A. Freed, Pleasant Township, Fairfield County. Large patches were seen on the backs and about the horns. The animals referred to had been dehorned, but the fly, true to its instincts, congregated about the stumps. At Sugar Grove, 8 miles south, a few were found, whilst at Rockbridge, 4 miles farther down the Hocking Valley, none were to be found. There appears to be none north of the first-named station, as I had a fair opportunity to examine cattle at Lakeside (Licking reservoir). They have not been seen at Columbus. It seems from the limited observations I have been able to make that it is spreading southward from near Lancaster. The Baltimore and Ohio Railway passes but a short distance north of this place, and it is easy to see that it is possible, or indeed probable, that it was introduced by transportation in cattle cars from the East.

Mr. Smith stated that the Horn Fly was not injurious in any part of New Jersey last year, stockmen adopting the plan of spraying with fish-oil compound. He also stated that the plastering of the dung was practised in his State in small stock yards.

Mr. Howard said that even in large grazing fields this latter plan is often practicable in spite of the objections which stock-growers urge. At the time when the flies are ovipositing the cattle are generally congregated in some one spot for shade.

Mr Lintner said that he heard of the fly in the southeastern portion of New York State.

Mr. Osborn said that there had been an unverified report of its occurrence in Iowa. He believes that the plaster treatment of the dung will be practicable in his State.

Mr. Fletcher said that many remedies which are considered impracticable by farmers prove eventually to be very practicable, and he instanced the poisoned ball system for cut worms, and said that standing grain can be sprayed with knapsack pumps.

NOTES OF THE SEASON.

BY ELEANOR A. ORMEROD, ST. ALBANS, ENGLAND.

The Secretary then read the following, which was addressed to the President, Mr. Fletcher:

You pay me the compliment of suggesting that I should send a short report of my entomological work of this year up to present date. But though it would indeed be a gratification to me if anything I could mention should be thought of interest, yet I feel such a hesitation in submitting anything I can say to such a supremely well skilled tribunal as that of the meeting of the Association of Economic Entomologists at Washington, that I will rather endeavour to give, in letter form to yourself, some notes of what we have been doing, from which, if you judge fit, you could lay some points, with my best respects, before the meeting

Paris green.—I think that I may now report the use of Paris green in fluid state (as a remedy for attacks of orchard caterpillars) as having thoroughly taken root in this country. It is not yet as widely spread as could be wished, but the very large amount of inquiry sent me during the spring and summer months as to the nature and method of application of the remedy gives me good hope that its use is extending.

We have nearly, if not entirely, overcome the clamour as to the use of a "deadly poison," and now I have rather to attend to the other side of the question and warn as to the necessities of care.

My correspondents are not without a sort of dry jocoseness in the matter, for having cautioned one inquirer that if he sprayed his gooseberries he had better have a large gooseberry pie made and *consumed* by himself and household as a proof that all was right, I presently received a donation of as fine green gooseberries as could be desired. Did he wish to transfer the experiment, I wonder? About effect of Paris green on leafage, one of my correspondents reports to me that in his plum garden (32 acres) he syringed twice with Paris green at a strengh of 1 ounce to 10 gallons, using the "Gelair" sprayer. He did not begin until the plum blossoms fell, and had to syringe twice because of the badness of the attack, also because rain came. The syringing was very carefully done so that there was no observable dropping from the leaves, and on the 10th instant he wrote me: "I have an extraordinary crop of plums in consequence."

With regard to foliage of the sprayed trees, he says:

> I find that the Pershore Egg Plum, Victoria, and Damsons, have their foliage quite uninjured and looking very healthy: but Czar and Rivers Early Prolific are decidedly injured, and New Orleans in a lesser degree. These are all the varieties I grow. Evidently some varieties of plums are much more easily injured than others by Paris green. (I.R.)

I hope, before preparing my next annual report, to obtain detailed information on this subject from various quarters, but I think the further observation of my correspondent (M. J. Riley, of Putley Court, W. Ledbury) well worth attention *here* until *we* are more experienced.

> I syringed 60 acres of apple trees which were badly attacked by caterpillars, 1 ounce to 20 gallons, which seemed to kill the caterpillars, so that one naturally asks, why make it any stronger for plums? (I. R.)

But I find difficulty in persuading people to be moderate, as they desire a strong spraying to do all the work at once.

M. J. Riley further notes, relatively to effect of method of spraying, that last year (before we could procure proper sprayers) he had only common garden syringes; that he syringed "Damascenes," badly infested, with the same strength of Paris green now used with success on several kinds of plums, namely, 1 ounce to 10 gallons, and too much being put on so that the trees dripped, the lower branches were killed.

After our real difficulties, and the boundless and fathomless amount of damage and trouble predicted last year, it is a very great satisfaction to me to have trustworthy reports of the excellent state of foliage of trees properly sprayed last year, and also to find the greatly lessened amount of caterpillar presence which occurs compared to previous appearances where Paris green applications or banding have been *properly* attended to.

But I should be ungrateful and fail in proper thankfulness if I did not acknowledge that, for this benefit to British fruit-growers from the use of Paris green, we are indebted, I believe, primarily, to the exertions of our respected friend, now holding the distinguished office of Entomologist of the Department of Agriculture of the United States of America, and likewise to the careful working forward of the subject both in the United States of America and Canada, and for myself I am bound to say (and I hope you will permit me to acknowledge) that but for the efficient and kind help you were good enough to give myself and our Gresham committee, I greatly doubt if we could have pushed the subject to its present well-based standing.

Our Gresham fruit committee is doing good work by the investigation of the members being extended to all our noticeable injurious fruit attacks which they discover to be present. These are entered on at their meetings. Where the insect pest is unknown to them they forward it to me and I identify (or procure its identification) for them, and with the addition of their practical observations of life history, and means of prevention and remedy, added to what we find recorded, we make serviceable advance.

It would be very advantageous if we had more such committees, for the work is so very *real*. No make believe or fanciful remedies gain the stated formal approval of a body of experienced fruit-growers whose returns depend on the treatment of their crops.

This year we have been working up for one thing, the Raspberry Beetle, *Byturus tomentosus*, Fab., which Mr. C. D. Wise finds at the Toddington fruit grounds may be best got rid of by shaking down into bags moistened or sprinkled with paraffin.

The Raspberry Bug Caterpillar of the *Lampronia rubiella*, Bjerk., has also been greatly troubling raspberry growers by its injury to the young buds and sometimes in the canes. We hope by gathering the infested buds or neighbouring bunches of leaves in which the larva has pupated, and destroying these, to have forestalled much recurrence of next year's attack.

Plum Saw-fly has also made a slight, and Apple Saw-fly a very decidedly injurious appearance. I conjecture that the similarity (to general inspection) of the attack of the latter to that of the Codling Moth Caterpillar has caused it not to be generally noticed before, and I hope to be able to add some notes on the changes in appearance of the larvæ. In all respects of habits and appearance preceding pupation this Saw-fly larva agrees with such descriptions as I have access to of that of the *Tenthredo testudinea*, Klug (=*Hoplocampa testudinea*, Klug), but *previously* I find that instead of the head being tawny or pale chestnut, and little trace of colour above the caudal extremity, that the head is pitchy black, and there is also a pitchy black plate above the tail preceded by a cross band and a few small markings also pitchy or black.

We have traced this change by the observer (Mr. Wm. Coleman, of Cranfield, Beds.) watching specimens for me in natural conditions through their transformations. I think that if this change has not been noted it will be of serviceable interest to record it, as on first glance the variously marked larvæ appear to be of different species.

For prevention of recurrence of this attack I am suggesting lightly shaking infested trees over cloths sprinkled with some mineral oil, so that the caterpillars which are very fairly active should not escape. Plum Saw-fly has been only reported from one locality.

The bud-galls on Black Currant caused by the *Phytoptus ribis* or Black Currant Gall Mite have been present to a seriously destructive extent. We know of no remedy for this attack excepting use of soft soap and sulphur wash, or, as a preventive of spread, breaking off the bud-galls. We, however, have found this year that parasites are at work in the persons of Chalcids, which we have not yet identified specifically, and from some small amount of further observation I venture to hope that we may find a dipterous larva is also aiding us in preventive service.

I fear these simple matters may not be worth your attention, but I just mention them as a part of the work to which our fruit growers are giving careful attention.

The field crop insects pests have been very prevalent this year, and at this time we have just begun a heavy visitation at three places in the east of England of the larvæ of the *Plutella cruciferarum*, Zell (Diamond-back Moth as we call it). But I ought not to venture to intrude on your time more than with just two further observations.

One, that I find the distorted growth of heads of Tares (*Vicia sativa*) which I drew attention to in my fourteenth report is originated by the presence of Cecidomyiid larvæ. I found them present in large numbers, and have carefully figured the head and caudal extremity and likewise the anchor process, which agrees so minutely with that of *Cecidomyia leguminicola*, Lintner, that I am looking forward with impatience to the development of the imago. My special colleague in observation of this attack (Mr. A. Hamlin of Chellowes Park, Lingfield), has planned an arrangement in the open field by which the imagos when they rise from the soil will (according to all ordinary habits of insect procedure) be safely trapped conveniently for examination. I am sparing no pains also myself to develop the imagos, though I have not the opportunity to attempt to rear the larvæ in absolutely natural and undisturbed circumstances.

My other observation is regarding the *Hypoderma bovis*, the Warble Fly. We are still fighting ignorance and idleness and downwright knavery, which are the supports of continuance of this attack; but I had the great satisfaction this summer of hearing from Mr. Bailey, the head master of the Aldersey Grammar School, Bunbury, Tarporly, Cheshire, that it was not worth while to give me a detailed report again this year, as for all practical purposes the attack was now stamped out in the district.

This gratifies me exceedingly. Some six or eight years ago, Warbles were described "as plentiful as blackberries" in the district, and, under the teaching of their admirably intelligent master, the boys, who are mainly sons of farmers and agricultural laborers, set themselves yearly to clear all the cattle they had acccess to of the maggots. I had yearly detailed reports of quantity killed, and now I can point to the district and to the satisfaction of the cattle owners as a proof of what can be done by the simplest hands where head and heart go to the work.

But now I ought not to add another word, and if there is anything in the foregoing pages which you think worthy of bringing before the distinguished Entomological meeting at Washington, it will be a great gratification to me. I should like much to be present myself, with the double pleasure of seeing many whom I know by their letters are kind friends to myself, and also learning much that would be of enormous benefit to me. (Torrington House, St. Albans, England, July 20, 1891.)

Mr. Southwick moved a vote of thanks to Miss Ormerod for her excellent paper. Adopted.

Mr. Osborn spoke of the great value of Miss Ormerod's work against the Warble Fly as showing how combination among workers can bring about almost entire immunity from this pest. Miss Ormerod's plan should be adopted in this country.

Mr. Fletcher also spoke highly of Miss Ormerod's work in this investigation.

Mr. Marlatt, however, stated that the plan of gathering the bots from the backs of cattle can only be practised in the East, where the cattle are domestic, and will not pay for the trouble in the West, where the cattle are wild and would have to be roped and thrown.

Mr. Fletcher thought, however, that the saving of hide value alone would pay for this trouble.

Mr. Southwick thought that it would be a very easy matter to rope and throw the cattle in the West, and considered that it would pay.

Mr. Osborn called attention to the fact that the majority of Western cattle are sent East and slaughtered so that the bots have no chance of maturing. He insisted upon the ease of stamping this pest out in restricted localities in this manner, since the flies do not migrate to any extent.

Mr. Kellicott stated that he had known the Warble Fly to be very bad in Oswego County, New York.

Mr. Lintner stated that it is not a general pest in New York State, but occasionally a local one. Mr. Lintner further stated that Miss Ormerod has proven the Plum to be less susceptible to the arsenites in England than the Apple—a remarkable fact and not at all in accordance with our experience in this country. This difference probably depends upon climate and upon difference in varieties.

Mr. Southwick suggested the reference of this question to the botanists.

Mr. Fletcher stated that the different varieties of plums show with him great difference in susceptibility to this treatment. He spoke of the great variation in the texture of the leaf and in other particulars in the varieties of plums. Much work must be done in this direction. He also mentioned the great susceptibility of the peach.

Mr. Alwood mentioned the fact that the addition of lime water to the arsenical mixture absolutely prevents the burning of the foliage.

Mr. Cook had found the Bot-fly attack much less in cleared farms than in wooded ones. In regard to the arsenites, he said that an abundance of Aphids and consequent weakening of the vitality of the tree might make it more susceptible.

Mr. Smith suggested that the water referred to by Miss Ormerod might contain lime salts so as to make the application more innocuous. He stated that the chemical reasons for the prevention of injury to foliage by the addition of lime water are given in the appendix to his annual report of the present year.

NOTES ON THE RECENT OUTBREAK OF DISSOSTEIRA LONGIPENNIS.

BY E. A. POPENOE, MANHATTAN, KANS.

[Secretary's abstract.]

July 10 to 19 the author visited the northern part of Lincoln County, Colo., on account of newspaper reports of the stopping of trains by grasshoppers. He found a strip of country 16 by 25 or 30 miles in extent fairly covered with locusts, which proved to be *Dissosteira longipennis*, a western isotype of the eastern *D. carolina*. They were congregated especially in the boundaries of this area. The country is poor, and planted here and there to corn and sorghum, and there are occasional patches of garden vegetation. The season has been favourable and cool. The locusts are said to have come in swarms from the South last fall, and to have settled along the Big Sandy Creek in a patch two or three miles in circumference, in which they laid their eggs in great numbers. Upon hatching this spring the young spread outwards. At the time of his visit in the northern part of the strip the insects were in the last larval and pupal stages, with very few imagos. At the south line, however, the winged individuals were very abundant and flew like birds. The young hoppers had the habit of crawling up the side of buildings for a few feet, presumably for warmth They were not strictly confined to roads, but travelled over bluffs and rounded hills, eating the buffalo and gramma grass. The winged individuals flew always to the south, but the others spread regularly outwards in all directions. The line of march was quite visible at some distance on the hillsides, and sheep-growers had to change the localities of their flocks In marching, as a general thing, they preferred to follow the roads, moving quite rapidly, about one mile in six hours for six or eight hours in a day only. They are credited with all the destruction which has been done by all kinds of insects, and he thinks that they did but very little damage to potatoes and corn, although marching through the fields in great numbers. At the time of his visit they were marching through wheat fields in the same way, but since he left they have done some damage to this crop. Many dead ones were noticed in one locality, but no signs of parasitism were found. It is supposed that they were destroyed by hail. In his opinion the insect occurs generally upon low ground rather than upon high ground.

Mr. Bruner said that this species is very seldom found below 3,000 feet, or above 5,500 feet elevation. It occurs in Nebraska, Kansas, Colorado, Wyoming and north-eastern New Mexico. It preferably locates itself on the side of the hills or the upper portion of slopes where the vegetation is scattered. Its near ally, *D. carolina*, is found throughout North America following civilization in cattle yards, roads, and streets. He had also seen the dead locusts in one locality in eastern Colorado, and considered that they had been killed by hail.

Mr. Popenoe said that he had really found that they had stopped trains, but upon steep grades only and by greasing the rails.

Mr. Osborn has found this species in southwestern Kansas in the higher portions of of river valleys and feeding upon the grass along the roads.

NOTES ON A CORN CRAMBID.

BY M. H. BECKWITH, NEWARK, DEL.

[Secretary's abstract.]

For three years the author had heard complaints in the southern counties of Delaware of an insect called by the people a "Cutworm." This year at the Experiment Farm at Dover many hills were destroyed by this insect which he had had an opportunity to study. The land was in timothy last year and planted to corn the present season. Large numbers of the larvæ were found, sometimes thirty in a hill, working around the outside of the stalk below the surface of the ground in silken galleries, but not boring into the heart of the stock. He had sent specimens of the moth which he reared to the Department of Agriculture and it had been determined for him as *Crambus caliginosellus.* He had tried Paris green, but does not know with what effect.

Mr. Smith had heard of a similar attack on corn in New Jesery. He advised the farmers to put on a heavy dose of kainit just after plowing and had heard no more complaints.

Mr. Osborn suggested that if the insect works like *Crambus exsiccatus* plowing at the right time will prove affective.

Mr. Howard said that the insect was abundant in 1886 at Bennings, Md., and that the only remedy which he was able to suggest at that time was plowing immediately after harvest.

Mr. Alwood doubted whether kainit would act as well as the refuse salt from meat-packing establishments, which he had found to be a good cut-worm remedy if sowed before planting.

Mr. Smith recommended kainit because it is a fertilizer as well as an insecticide.

Mr. Alwood stated that kainit is a bad form of potash for tomatoes and potatoes.

Mr. Southwick said that his grandfather used to drop a salt herring into each corn hill as a preventive against Cutworms.

Mr. Beckwith said that he had applied a fertilizer aud salt in Delaware for cabbage and thus prevented Cutworms, as he proved by a check experiment.

Mr. Alwood uses tobacco also in fertilizers as insecticides.

NOTES OF THE YEAR IN NEW JERSEY.

BY JOHN B. SMITH.

During the spring of 1890 the larvæ of the Clover-leaf Beetle, *Phytonomus punctatus*, appeared in great numbers and threatened to become seriously destructive. A fungoid disease opportunely attacking them, the vast majority were killed off before they were more than half-grown. Some few escaped, however, and the threat of injury was repeated during the spring of 1891. The numbers were not so great, however, and the fungus disease stepped in as before, destroying the larvæ before they had done serious injury.

Complaints of twig blight in apple were made early in the season, and on investigation two coleopterous insects were found to be concerned in it. One of these, the larva of *Eupogonius tomentosus*, bored through the centre of the new wood, or rather that made during the previous year, and killed the twig. The beetles appeared in June. The other was a small Scolytid, probably *Hypothenemus*, which made short galleries in the extreme tip of the twigs infested by the Longicorn larva. It is probable that this attack is secondary, and not made while the wood was sound.

Some discussion was had at our last meeting concerning the points of the tree attacked by the larva of *Saperda candida*. (Fig. 15.) This led me to observe carefully during the present season, and I find that while in quince the attack is almost exclusively at the base of the tree, in apple and pear, any part of the trunk and even the larger branches may be attacked. The larvæ are more numerous at the base, as a rule, but the other localities are not by any means exceptional. I know that no other larvæ were concerned, because I cut out pupæ and imagos as well, and am certain of my facts.

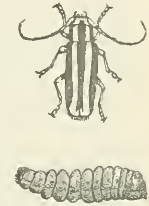


Fig. 15.

Peach borers, the larvæ of *Sannina exitiosa* (Fig. 16), are now largely treated by mechanical coatings to the trunk. The favourite means is the one recommended by me in the bulletins of the station and at farmers' meetings. It is simply a thick whitewash with Paris green and glue added. I have never discouraged the use of other mechanical coatings, but have taken great pains to explain that no remedial results must be expected; that the measure was protective merely. The use of paint, as suggested by Mr. Alwood, does not find favour, owing to a fear that injury may result to the tree.

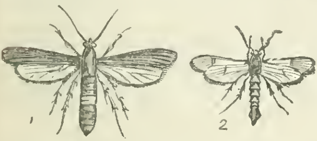


Fig. 16.

Blackberry insects have been particularly observed; but as I have already described these, a mere mention here is all that is needed.

The Rose-chafer, *Macrodactylus subspinosus*, has been less destructive than usual. My studies on this insect have appeared in bulletin form, and I need only emphasize here that all my tests of remedial measures were made in the field under ordinary field conditions, and that the results are such as would likely be obtained by a farmer employing them.

The Grape Flea-beetle made its appearance very early in the year, before even the leaves had made their appearance, and began eating the buds. I recommended collecting in kerosene pans early in the day, and this proved effective. About a pint of the beetles were sent me in grateful acknowledgment.

Root maggots have been very abundant, and onions have been most severely attacked. In some places the young sets have been completely destroyed. This pest is now pretty well distributed in the trucking districts around Philadelphia.

Aphides on orchard fruits, and particularly on apple, became very abundant during a three weeks drought near New Brunswick, and blackened tips everywhere caused serious alarm. A cold storm, lasting two days, broke the drought, and apparently checked the multiplication of the species. There was no further increase of injury, at any rate, and no other complaints reached me.

The melon vines have suffered greatly from attacks of Aphides, but still more from a bacterial disease. The damage done by the latter is quite usually attributed to the Aphides.

I have made some study of squash insects, more particularly of the "Borer" *Mellittia ceto*, of which I have previously spoken. The Stripped Beetle, *Diabrotica vittata*, does not bother our large growers very much. When they seem abundant, they use lime or plaster on a day when there is a gentle wind, sowing it on broadcast. The beetles fly before it and are driven off the field. The next man takes up the work on his field, and so the beetles are driven off until they reach some unguarded field which is then usually injured quite seriously. *Epilachna borealis* has been very abundant, and has eaten characteristic patches at the edges of the leaves. The insects made their appearance as soon as the squashes were well up, but did not begin mating or ovipositing until the middle of July. Larvæ were not found until August. This gives quite a long period for the mature insect. It is easily kept in check by the use of the arsenites.

The Corn Bill-bug, *Sphenophorus sculptilis*, appeared in large numbers in Burlington, Salem, and Gloucester Counties, and perhaps in other surrounding regions. The beetle drilled the characteristic holes in the young plants at or near the surface and thus destroyed many acres of corn. I advised replanting after a short delay, and the second crop of plants was undisturbed. The insect was a new one to growers, and its appearance in such numbers caused consternation. They were most numerous on old sod, but by no means confined to such land.

Diplosis pyrivora has been complained of as an injurious species for the first time. It has reached Newark, Montclair, Elizabeth, and Paterson, so far as my information extends, and has probably been in some orchards for at least three years. Where it first made its start in this State I have been unable to ascertain. The Lawrence pear is the one most generally attacked, in one orchard over 90 per cent. of the fruit being infested. From an examination of the infested fruit I believe the egg is laid in the ovary, or if not that, the young larva does not pierce the fruit, but follows the pistil into the ovary or seed chamber, the opening in this variety of pear being quite wide. In many cases also this same passage is used by the larva to leave the fruit where it remains sound and does not crack. This promises to be one of the most dangerous of the fruit pests.

Spraying fruit trees with London purple has been very generally practised in New Jersey, and always with most gratifying results. An unexpected result has been the destruction of the fungus on the pear which so generally disfigures varieties like the Bartlett. Fruit on sprayed trees is fine and clean, that on the others is spotted and clouded and of an inferior grade.

The Plum curculio has made a plum crop almost impossible in New Jersey. I made only one experiment myself during the season, spraying one tree with the kerosene emulsion, 1 to 12, once a week for six weeks. At the end of that period nearly every plum on the tree had from one to six larvæ, and I called the experiment a failure. Several growers who had a few trees only report a favourable result in spraying with the arsenites, and there seems little doubt but that a certain percentage of fruit can be saved in this way. For small trees of choice varieties I suggested cutting out the egg. This was done in a few cases with absolute success. It leaves only a trifling scar, no more than that of the original puncture, and is certain in effect. Of course this would not answer on a commercial scale, but for choice fruit in the garden it is not impractical, and might be used to supplement spraying with arsenites.

I have followed out my inquiries into the action of certain fertilizers as insecticides, and am more than ever convinced that in kainit we have a powerful agent for the destruction of forms infesting sod-land. Where this material is used before planting corn even on old sod, cutworms and wireworms will do no injury. In addition, I always advise fall plowing to give the winter a chance. Direct experiments in the laboratory show that Elater larvæ will die in soil that contains kainit, though it acts slowly and two weeks are required to produce a complete result. The experiments will be given in detail elsewhere.

Mr. Alwood, in discussing, said that he had recommended London purple against *Fusicladium* for some years.

GOVERNMENT WORK AND THE PATENT OFFICE.

BY C. V. RILEY, WASHINGTON, D.C.

[Author's Abstract.]

The paper was based on a patent recently obtained by three parties in California for the treatment of trees by hydrocyanic acid gas for the destruction of scale-insects and other insects that injuriously affect trees. It reviewed at length the efforts of the Department in this line of investigation, and showed conclusively that this gas treatment had originated and been perfected by one of the agents of the Division of Entomology, who had, in fact, for the past five years, been carrying on a series of experiments in this particular line under the author's direction; that so soon as the treatment came to be recognised as of the greatest utility and perfected so that it was cheap and available to all needing to use it, application for a patent was made by the parties in question, and, in spite of an official protest from the Department of Agriculture pending the application, a patent was finally granted, as, under the law, the Commissioner of Patents has no right to consider *ex parte* testimony pending examination, even though offered by an officer of the Government in the interest of the public. The fact that the process had been fully described and recorded in official reports from the Department of Agriculture did not prevent the issuing of the patent. So valuable is this treatment considered that an effort has been made in southern California to subscribe the sum of $10,000 to buy the right from the patentees. The author remarked that he personally had no hesitation in advising the orange-growers to pay no heed to the claims of the patentees, and that it would be wiser to combine to oppose them if suit were brought than to subscribe to give them an undeserved and valuable royalty.

His own conviction was that the patent was invalid and the certificate but a piece of paper carrying no absolute evidence of priority of invention; and it is greatly to be regretted that, through legal technicality or otherwise, it should ever have been granted.

The author mentioned other cases of this kind where, after years of labour and large expenditures on the part of the Department of Agriculture, valuable results had been obtained. In some cases they took the form of mechanisms, which were described and figured in the official reports; in other cases of mere discoveries. He said:

"There is nothing more discouraging to an officer of the Government engaged in original investigations, with a view to benefiting the public, than the efforts of various private individuals to appropriate the results, of which the foregoing case is an example. I have been engaged now for nearly a quarter of a century either as a State or Government officer in investigations, having for their object in the main the protection of plants and domestic animals from the attacks of injurious insects. Either directly or with the aid of assistants these investigation have resulted in some important discoveries of universal application, and I can say with pride that, though often urged to take personal advantage of such discoveries, I have in no single instance accepted a fee for information given, or received a dollar from any application of these discoveries, even where others have reaped fortunes. As a salaried officer my duty was plain, and I make the statement, without boastfulness and simply to emphasise the discouraging fact, that in every instance where the benefit to the public has been great, either the honour has been contested by private parties or else means have been taken by private individuals to control, through patent or otherwise, the discoveries for their personal ends."

It would seem that on this account the Patent Office should endeavour, in considering applications for patents for objects which the Government is already endeavouring to accomplish, to ascertain fully what the Government has done, as any other course will tend to pervert, discourage and neutralize all honest efforts made by other Departments of the Government for the public good. It would seem, also, that there is need of some modification of the law in so far as Government evidence is concerned.

Mr. B. P. Mann said that no patent can be held valid unless held by the inventor. The Government ought to get out a patent on the broad invention, and it could then prevent the present holders of the patent from using it.

Mr. Riley and Mr. Mann further discussed the subject.

The president announced that a reception, to which all were invited, would be held at Mr. Riley's residence, Sunbury, Wyoming avenue, at 7 o'clock this evening.

The meeting then adjourned.

AFTERNOON SESSION.

The meeting was called to order at 2.30 p.m. by President Fletcher. Twenty-eight persons were present. The minutes of the preceding session were read and approved. The committee on nominations reported the following nominations for the ensuing year:

For president, J. A. Lintner, of New York.

For first vice-president, S. A. Forbes, of Illinois.

For second vice-president, J. H. Comstock, of New York.

For secretary, F. M. Webster, of Ohio.

On motion, the report of the committee was adopted, the committee was discharged, and the officers named were declared elected. The name of George H. Hudson, of Plattsburg, New York, was presented by Mr. Lintner; that of H. A. Morgan, of Louisiana, by Mr. Weed; that of B. P. Mann, of the District of Columbia, by Mr. Bruner, and that of Miss M. E. Murtfeldt, of Missouri, by Mr. Riley. All of these names were ordered to be inscribed upon the roll of members.

On motion of Mr. Howard, seconded by Mr. Smith, it was resolved that the next meeting of the society be held at the place of, and two days preceding, the next meeting of the American Association for the Advancement of Science.

Mr. Riley read a paper entitled "*Dermestes vulpinus* and Tobacco," which is held for publication elsewhere.

Mr. Southwick stated that he had found *Dermestes* under the bark of a mahogany log in New York, and that it had entered this crevice for pupation after having originally fed upon some animal matter.

A NOTE ON PARASITES.

BY L. O. HOWARD, WASHINGTON, D. C.

The object of this brief note is to impress upon the members of this Association the fact that one cannot be too careful in statements for publication concerning the relation between a given parasite and its host.

The possibilities for error are very great, as a few instances will show.

In 1882, while studying the Army Worm at Huntsville, Ala., I noticed an Ichneumonid walking about a fence-rail over which the worms were swarming in countless numbers. The parasite was apparently excited, walked and flew from one part to another, occasionally lighted upon a caterpillar and brought her ovipositor into position. I captured her, and in my notes wrote "Found ovipositing upon the larva of *Leucania unipuncta*." Now it transpires that this Ichneumonid was *Bassus scutellatus*, and as the consensus of rearing experiments shows, the species of this genus are parasites of Diptera, and my inference was in all probability entirely mistaken. If the original observation had been published it would have been absolutely necessary for perfect safety to have detailed the circumstances in order that future students should not be misled.

Recently a well-known entomologist sent to Professor Riley specimens of the common *Pteromalus puparum* with the record "Reared from the cells of a mud-wasp." From what we know of the habits of this parasite we may take it for granted that had the entomologist in question examined the cells of his mud-wasp he would have found specimens of some lepidopterous larva or pupa stored up as food for the young of the wasp and that from these stored-up insects the parasite had emerged.

Within the last few weeks specimens of a Chalcidid were received from a most careful observer and excellent collector, with the statement that they were reared from the eggs of a saw-fly deposited in a willow leaf. While I am not in the habit of discrediting any statement which this gentleman makes, and while I have learned by experience that his accuracy is something astonishing in this world of error, the fact remains that this parasite is plainly from the known habits of its near relatives an enemy of some lepidopterous or dipterous leaf miner, and that never under any circumstances would it have been an egg parasite. He had probably put his willow leaf in a pill box and had later found the parasites in the box. He did not examine the leaf carefully for traces of a leaf miner or he would never have sent in the record.

Where the parasite is reared from a gall or from a twig burrowed by some other insect it often happens that it is assumed to be parasitic upon the gall maker or upon the most abundant twig borer. Such an assumption should never be made without a complete statement of the facts and without the most careful examination of gall and twig, to see whether they were not inhabited by other insects either as inquilines or parasites, or in the case of twigs as perhaps unnoticed borers.

Instances like these might be multiplied, but this will suffice to indicate the absolute necessity, first, of extreme care in forming conclusions, second, of detailing all circumstances which may possibly have led to error. It is only by such careful work as this that we can ever arrive at proper conclusions concerning the group habits of parasites. Our present published records are full of errors and require a most careful sifting of evidence, which in many instances can no longer be obtained. The most heterogeneous and unlikely errors in many genera are published, and the discriminating work is of extremely slow accomplishment.

Mr. Fletcher stated that he had seen an Ichneumon ovipositing upon a glume of wheat upon which there was no insect.

Mr. Doran stated that he had reared a parasite from *Bruchus scutellaris*.

Mr. Howard stated that this parasite was probably an undescribed species of Mr. Ashmead's genus *Bruchophagus*.

REPORT OF A TRIP TO KANSAS TO INVESTIGATE REPORTED DAMAGES FROM GRASSHOPPERS.

BY HERBERT OSBORN, AMES, IOWA.

In accordance with instructions received July 24, to visit and report on grasshopper injury in western Kansas I started the following morning for Kansas and improved every opportunity on the way to learn of grasshopper injury. The following account is in advance of a report prepared for Dr. Riley. At Des Moines, where I waited a few hours for the Kansas City train, I went through a large number of Kansas papers, kindly placed at my service in the office of the State Register and Iowa Homestead, without, however, getting any information except assertions in some places that there were no hoppers in Kansas.

From a gentleman lately through Arizona, I learned of the appearance of considerable numbers in that Territory, and the expectation that these might be travelling eastward. At Kansas City I was equally unsuccessful, the only information received there being the statement of railroad men as to the occurrence of hoppers on the railroad in Colorado (the case investigated by Professors Snow and Popenoe), and of some in Arizona, along the line of the Atchison, Topeka and Santa Fe Railroad.

At Topeka I went first to the office of the State Board of Agriculture. The Secretary, Mr. Mohler, was absent, but the gentlemen present, Messrs. Longshore and Niswander, kindly gave me a full statement as to the information the office contained.

They receive reports from over 600 correspondents who are scattered over the entire State, the western portion being well represented. They assured me that not a single report had been received by them which mentioned injury from grasshoppers, and they were positive that no damage was being done.

At the newspaper offices I received similar replies, except that in the office of the *Kansas Democrat* I learned of a report that some damage had been done in Kearney County. As this report, however, was somewhat indefinite, I hesitated to make it the basis of a special trip to the extreme southwest part of the State, and Lawrence being so near at hand, I concluded to go there to see if Professor Snow had any recent information.

Professor Snow was absent, but his assistant, Mr. V. L. Kellogg, kindly gave me all the information he could. He said that they had heard nothing from the region that had been examined by Professors Snow and Popenoe in Colorado except that the winged insects were moving south, and he was sure that none of these had entered Kansas.

He also informed me that they had received information of injuries at Garden City, and showed me specimens of *Caloptenus differentialis* and *bivittatus* received from there.

This information tending to substantiate the report of damage in Kearney County, I decided to visit Garden City, and took the first train for that place. On the way I kept careful outlook for any signs of damage, and improved the opportunity of occasional stops to collect specimens and inquire of residents as to the prevalence of grasshoppers. All answers agreed in denial of any unusual numbers of grasshoppers or of injury from them, and it was not till I reached Garden City that I learned of any damage. Here I was told that the alfalfa fields were being ruined, and it was only a short time after my arrival that I was in a field a mile from town where the conditions showed at once the state of affairs to be serious.

The alfalfa was badly stripped, the blossoms and seed entirely eaten up, and in many patches the stems were stripped bare of leaves, looking brown and dead.

The grasshoppers, mostly *differentialis*, with a considerable number of *bivittatus*, when rising in front of me as I walked through the field, formed a cloud eight or ten feet high and so dense as to hide objects beyond them. Here I noticed a number of grasshoppers dead from the attacks of parasitic *Tachina*.

From this field I went to another, owned by the same man, which was also well filled with grasshoppers, but the injury here was less, especially around the buildings, where a large number of turkeys were doing excellent service in killing the hoppers and at the same time adding rapidly to their own weight.

In a field of sorghum directly adjoining there was also considerable injury, but *differentialis* seemed scarce, while a bright green species, *Acridium frontalis*, Thos., was abundant and apparently the principal agent of destruction. This species was also noticed here and in other places occurring in great abundance on the wild sunflower so common on these plains, and the question arose whether this was not its natural food plant and its attacks on sorghum incidental.

The day following I spent the forenoon with Dr. Sabin, who kindly furnished a horse and cart and accompanied me in examining a number of farms within five miles of Garden City, where alfalfa fields and orchards were injured. I met and talked with a number of farmers who had suffered from grasshopper depredations, and the information received from them with what I gained by personal observation satisfied me that losses could be avoided by proper measures.

I learned that the same injuries extended farther west along the river where alfalfa was grown, and I proceeded from Garden City to Lakin, observing on the way that all alfalfa fields showed presence of grasshoppers, but that in some cases the bloom was still free from serious injury or destroyed only in patches. At Lakin I learned that injury had been serious, especially on the place of Mr. Longstreth, some two miles from town. Some fields near the river and occupying low land were noticed in full bloom and showing little damage, but still grasshoppers could be found in abundance by closer inspection of the fields.

Mr. Longstreth's son, being in town, drove me out to his father's farm, and accompanied me on a tour through his extensive orchard of ten acres, his oat fields and alfalfa fields, in all of which the damage had been serious. Many of the trees in the orchard were entirely stripped of leaves, and in some cases the bark had been eaten from the limbs. The alfalfa presented the same appearance as observed in other fields. I found here a great many dead grasshoppers, whose empty shells attested the activity of *Tachinæ.*

I was told by Mr. Longstreth that skunks were amongst the most active enemies of the grasshoppers, and he believed played an important part in reducing them. He had even seen one up in an apple tree catching hoppers on the limbs.

I learned at Lakin that alfalfa was also grown in the next county west, at Syracuse, and that damage was also reported there, but on reaching the place found the injury slight as compared with the other places visited. In fact, aside from one farm on which some damage to alfalfa and orchard had occurred I could learn of no loss. *Caloptenus differentialis* I found in some numbers, and there is little doubt that unless some effort is made this fall and next spring to destroy eggs and young they will multiply as in other localities, and probably by next season prove as destructive as in them.

As this point carried me into the westermost row of counties in the State, and there was no report of damage farther on, I determined to cross northward to the Missouri Pacific Road, in order to follow up some rumours regarding damage from grasshoppers at some points intervening, and which, from the descriptions given, seemed possibly to be due to *Dissosteira longipennis.* No point where serious loss occurred was found, however, and this species occurred but sparingly at points between Syracuse and Tribune, and occurred at Horace only in small numbers, too few to cause any apprehension for the immediate future at least. Taking the Missouri Pacific, I passed through to Kansas City without finding any evidence of damage from grasshoppers, and as I could learn of no other localities in the State than in the three counties examined where such damage was reported, I returned to Ames, and will now proceed to a detailed account of the territory examined, the species observed, and the special measures needed to meet the outbreak in this section.

THE TERRITORY AFFECTED.

The damaged territory is quite easily defined and might very properly be said to coincide with the irrigated portion of the Arkansas Valley lying in Finney, Kearney, and Hamilton Counties in southwest Kansas. The entire irrigated district, however, is not equally injured and there are some fields much less damaged than others. The whole area covered extends with occasional breaks a distance of about fifty miles along the river and forms a strip from one to five miles wide but limited entirely to areas where irrigation has been practised, and within this limit is dependent upon the kind of crops raised.

The greater damage was observed at Garden City, though nearly as bad was seen at Lakin, and but little was found at Syracuse, corresponding as near as I could learn pretty closely with the length of time since alfalfa has been made a principal crop on the irrigated lands.

THE CROPS AFFECTTD.

Alfalfa is the crop in which there is the most loss, but orchards are suffering badly and were they extensive throughout the district would very probably present the heavier loss.

The alfalfa crop is a very profitable one and easily grown with irrigation and has been very extensively planted, the fields devoted to it covering many thousands of acres.

The injury to this crop is of such a nature that I believe practical remedies may be adopted, and. as will be stated later, active measures should be adopted this fall and next spring.

THE AMOUNT OF INJURY.

The great loss this year has resulted from the destruction of the seed crop. In many fields this has has been a total failure, and the loss may be considered as covering thousands of acres and involving many thousands of dollars. One man who had something over 100 acres in alfalfa considered that his loss amounted to about $2,000. While he expected to cut and use the crop for hay, the damage had been such that the hay would be little better than after the seed crop had been secured, and he reckoned the full loss of the seed crop for the season. In some cases farmers were cutting for hay when they had intended to allow the crop to go to seed, and in this way were reducing the amount of their loss by the value of the crop of hay cut early over what the hay would be worth after maturing seed, the latter, of course, being much less valuable than the hay cut before seed matures. In many cases the farmers had been depending largely upon the crop of seed to help them out of debt, and the loss from the grasshopper injury falls heavily upon them.

THE SPECIES DOING THE DAMAGE.

The Differential Locust is, I think, chargeable with fully nine-tenths of the destruction, both in alfalfa and orchards, and the reasons for its increase in this section seem to be quite evident. The irrigated fields of alfalfa furnish it with favourite food in abundance throughout the year, and have given it an opportunity to multiply rapidly without exhausting its food supply.

The ditches which traverse the fields and possibly parts of the fields themselves furnish a most excellent location for the deposition of eggs, the ground being compact and for the most part undisturbed throughout the year. That the eggs are deposited in or alongside the ditches is indicated by several facts, though at the time of my visit the locusts, while pairing, were none of them ovipositing. In the first place, the greatest damage had occurred in strips on either side of the ditches, and only in the worst fields extends over the entire field ; second, at the time of my visit the pairing individuals were quite evidently collecting more particularly in these locations ; third, the testimony of those who seemed to have observed most closely agreed in placing the greatest number of young hoppers in spring along the borders of the ditches, a point which is clearly supported by the injured strips so plainly to be seen. No one whom I questioned had seen the locusts in the act of ovipositing.

The ditches contain no water during a large part of the year, and in fall the compact bottom, which doubtless affords more moisture than the fields in general, would seem an excellent place for the deposition of eggs, as well as the banks on either side. Judging by the habits of these and allied species in other locations it would be hard to conceive a more favorable place for the deposition of eggs, and it seems to me very probable that this, as well as the suitability and abundance of the food, may be considered an important factor in the rapid increase of the species in the last three or four years, an increase that has taken place directly with the cultivation of alfalfa by irrigation.

It would seem also that this habit renders the insect especially open to attack, and I see no reason why concentrated effort may not entirely prevent a repetition of the damage another year.

MEASURES RECOMMENDED.

The situation, it seems to me, is one deserving serious attention, but one which offers every hope for successful work, if the residents of the affected localities can but be induced to make a little effort at the proper time.

The injury for the present season is mainly past, as the grasshoppers are in large part mature, many already pairing, and the loss of the seed crop, the heaviest part of the loss, beyond repair. The effort, therefore, must be toward preventing the damage another year, and it seems to be very desirable that the Division should distribute to the people of this section a careful set of directions for their guidance this fall and next spring in working against the grasshoppers.

The means which appear to me from the inspection of the ground to promise most successful results would be as follows :

(1) To thoroughly break up the surface of the ground in and along the ditches before winter by harrowing thoroughly, cultivating or shallow plowing, thus exposing the eggs to winter weather and natural enemies.

(2) Wherever practicable, to flood the ground for a day or two at the time young locusts are hatching. I was told that the young hoppers were entirely unaffected by water, as they would crawl up the alfalfa stems and escape, and it is probable that sufficient flooding to accomplish much good in this region is out of the question. My only hope in this line would be in watching carefully for the time of hatching, and using the water before the hoppers had obtained any growth, and if abundant along the ditches, putting a little kerosene on the water.

(3) A use of the hopperdozer as early in the season as possible, when I believe the treatment of a strip eight or ten feet wide on each side of the ditches would destroy so large a part of their number as to prevent any serious damage. As I learned from a number of parties the hoppers are scarcely half grown when the first crop is cut, it would seem that immediately after cutting the first crop would be the best time to use the hopperdozer. The hoppers would be large enough to jump readily and the dozers could be run very easily. It would be difficult to use them at any other time then directly after a crop was cut, as the dense growth of alfalfa would obstruct their movement.

My strongest recommendation would be the urging of effort in breaking up egg masses before winter, and then in case locusts still appear in any number in spring to resort to the dozers at first opportunity. I believe active use of these measures will be effectual, with a cost but trifling compared with the value of the crop to be saved.

The information as to the species and the measures needed are covered very fully in your Bulletin on Destructive Locusts, and with some specific instruction regarding the treatment of ditches in this special locality would, I think, give the people of the district affected all the information necessary to protect themselves, and it would seem advisable to send a number of copies of that bulletin to the postmasters at Garden City, Lakin and Syracuse, to distribute to farmers who would make use of them, as well as to those whose names I will furnish for this purpose.

OTHER SPECIES OBSERVED.

The species next to *differentialis* that I should call most abundant in the injured fields was *bivittatus*, but taken alone its damage would have been insignificant. Its habits are so nearly like those of *differentialis* that I see no occasion to give it further mention, and I have little doubt that any measures adopted against *differentialis* will prove as effective against this species.

Still other species occurred, but seemed generally distributed, and so far as injury in the devastated fields is concerned need no mention.

THE LONG-WINGED LOCUST.

Dissosteira longipennis was taken in some numbers at all points visited in Finney, Kearney, Hamilton and Greeley Counties, and as this species has caused so much injury in eastern Colorado this season, I took rather special pains to note its abundance and inquire as to any destruction resulting from it. At no point did it occur in destructive numbers, and I should not look for any injury from it in these localities in the near future at least.

Most of those noticed were winged, some still fresh from the pupa stage. In general all the winged ones, when disturbed, moved southward, but nothing like a general migration was seen. At Lakin I was told by a Mr. Logan that a large black-winged grasshopper had been common near that place, and when winged had travelled uniformly southward.

PARASITES AND DISEASE.

The many parasitized grasshoppers noted indicated a multiplication of such forms, and these will undoubtedly accomplish much in reducing the numbers that can deposit eggs this fall, but I should deem it unwise to depend on them and to omit the active measures already urged.

The most general parasite was apparently the Tachina flies, as the great majority of dead hoppers were found to be completely devoured within, and in most cases the opening through which the maggot had issued was to be seen. Adult *Tachinæ* were also observed in the infested fields.

Some of the dead grasshoppers had the appearance of having been affected with *Entomophthora*, and I gathered a number in order to make an effort to cultivate the disease, but as yet have nothing to report in this line. The dead hoppers will be kept with living ones, and if the latter take the disease we may hope to still further multiply the disease by inoculating still others, and then an effort can be made to distribute the disease in the fields. Its spread, however, is evidently slow, and I do not think other measures should be neglected this season for a plan which is still uncertain.

Among the natural enemies observed, toads were perhaps the most common, some of the fields containing great numbers of them, especially of half-grown individuals, and these would seem capable of greatly reducing the numbers of hoppers. A dead one, which saved me the necessity of making a dissection to get positive proof, showed in the partly decomposed stomach the legs and other parts of grasshoppers, proving that, as would be inferred from the presence of toads in the fields, their mission was to feed upon the grasshoppers.

The attacks of skunks upon grasshoppers, as stated by Mr. Longstreth, have already been mentioned.

As the tendency is for natural enemies to multiply with the increase of any species of insect, we may look for increased assistance from this source by another year, and in connection with the measures already urged, these ought by another year to keep the insect entirely within the limits of destructiveness.

THE CLOVER-SEED CATERPILLAR.

(*Grapholitha interstinctana*, Clem.)

BY H. OSBORN AND H. A. GOSSARD, AMES, IOWA.

On the evening of the 23rd of May many small dark brown moths were noticed flying about a clover field upon the College Farm. They were resting upon the blossoms and among the leaves, and upon being disturbed would fly a few paces and then settle again. These moths proved upon examination to be *Grapholitha interstinctana*, Clemens, the parent forms of the clover-seed caterpillar mentioned in the Entomologist's Report to the Commissioner of Agriculture in 1880. We had during the past winter received specimens of clover-seed which we suspected of being damaged by this pest, which has been reported as injurious in some of the states east of us in the last year or two. The moths are also remembered as occurring at Ames in numbers some eight or ten years ago. They were not, however, at that time connected with any damage observed in clover fields.

The moths increased in number from the time they were first observed until, by the 3rd of June, in the early evening, when the field lay between the observer and the sun, a perfect cloud of them could be seen hovering over the blossoms as far as the eye could reach. They would spring up from under the foot like grasshoppers in a meadow on a sunshiny day. It was also noticed that they were pairing freely at this time.

On the 24th of June an examination of 177 heads of clover taken from the field before mentioned showed 91 heads infested with the caterpillar of the moth as against 86 not infested. Many of the larvæ were full grown and some were spinning their cocoons. The hay was cut at this date. An examination the next day, June 25, of 48 clover heads taken from scattered bunches on the college campus, showed 8, or $16\frac{2}{3}$ per cent., of the whole infested. Examining 42 heads from a different field, cut on the 23rd and 24th of June, only 3, or 7 per cent., were found infested.

The damage was done by eating into the young florets, and later into the seed vessels, causing the heads to dry up and the flowers to shell from the receptacles like chaff.

The larva is a small, greenish white caterpillar, with a dark brown head, about .25 to .30 of an inch long when full grown, many of them becoming tinged with red toward the hinder extremity as they approach the time of pupation. About the 24th of June the adults had nearly all disappeared, a few stragglers only being found by diligent search. Of a number of larvæ preserved in a breeding cage the first pupa was found July 14, but a visit the same day to the field before mentioned proved the second brood of the adults to have already appeared. An examination of dried bunches of hay left on the field disclosed some larvæ in the heads, which had spun their cocoons to pupate, from which it is concluded that the caterpillars can live in the cut hay for a considerable time if not hampered in their movements. An examination of the hay from the same field stored in the barn showed all the larvæ to be dead. A dead pupa was also found, but nothing living. There were no empty pupa cases found to indicate that any moths had escaped from the hay thus stored. It seems certain, therefore, that everything that was subjected to the pressure and heat incident to storage was killed. The remedy, then, for this pest, which has caused the destruction of probably 50 per cent. of the clover seed in the field observed, is to cut the hay soon after the first brood of larvæ appears, or in early June. The hay should be carefully cleaned from the field, so that no larvæ will find harbour in stray bunches which have not been gathered up. Scattered clover growing by the roadsides and in the fence corners should also be carefully mown at this time, and the heads at least disposed of in some manner to insure the destruction of the larvæ they may contain. This method can not but prove effective in reducing the second brood of the moths, and will also operate against the clover-seed midge *Cecidomyia leguminicola*.

The track of the larva is very uniformly from the base of the head upward, and the younger larvæ are almost invariably found near the base, and beginning their work on the florets there. It would seem, therefore, that the eggs are deposited at the base of the receptacle, and the larvæ upon hatching may begin at once upon the older florets. In working upward, roughly speaking, they usually form an irregular spiral track around the receptacle.

The delicate, white, silken cocoons of this insect are spun in the head among the dried florets, frass and bits of eroded but undevoured flowers so covering them with brown as to make them difficult of detection. The pupæ work their way entirely out of their cocoons and drop to the ground before bursting their pupa cases, which may be found in abundance on the ground from which a brood has just issued.

The second brood was observed pairing during the last week of July, and August 5 the larvæ were found in great numbers, one having at that time spun its cocoon preparatory to pupating. The rate of growth would seem to establish that there are three broods per year at Ames, and possibly, though not probably, four. [In advance from a forthcoming bulletin, No. 14, of the Iowa Experiment Station.]

STANDARD FITTINGS FOR SPRAY MACHINERY.

BY WILLIAM B. ALWOOD, BLACKSBURGH, VA.

(Abstract by Author.)

It is my desire to briefly present to this Association a matter with which doubtless many of your members are already familiar, and which I feel confident will meet the hearty approval of all the economic workers. At the Champaign meeting of the Association of Agricultural Colleges and Experiment Stations, held in November, 1890, I presented a paper before the botanical section, dealing with some of the newer forms of machinery used in fungicidal work, and pointed out the great inconveniences under which we labored from the diversity of styles and sizes of fittings and thread connections used in the various machines now offered by manufacturers. The subject was considered of such importance that a motion was carried to ask the sections of entomology and horticulture to unite with the botanists in appointing a conjoint committee, which should be charged with recommending to manufacturers such styles and sizes of connections and fittings as were thought to be most convenient in the practical work of treating injurious insects and the fungus diseases of plants. This committee, as finally organized, was composed of the writer, as chairman, Mr. G. D. Fairchild, assistant mycologist of the Department of Agriculture, and Prof. James Troop, horticulturist of the Indiana Experiment Station.

This committeeissued a circular letter to manufacturers which met with a very general and cordial response from them. Nearly every one fully endorsed the ideas set forth by the committee, and most of the prominent parties agreed to carry out the committee's suggestions so far as practicable with the state of their business. By the time standard styles of fittings could be circulated among the makers of spray machinery the season of '91 was so far advanced that we could not hope to effect much change during the current year. However, now that interest and sympathy with this effort have been awakened, we believe that it is possible through united effort to secure all we ask in this line. While we are all aware that the members of this Association are in a large part station entomologists, it is also true that some very prominent members are not connected with station work ; hence my reasons for bringing this subject before you for discussion. To any one who has had actual experience in field work the importance of better, and, I will say, uniformly standard sizes of fittings, can not be doubted, and to aid in securing this desideratum is the chief purpose of my paper.

I shall at an early date publish an illustrated circular dealing with the question of styles and sizes of fittings, which will give detailed information, both for the use of manufacturers and the special workers.

On motion of Mr. Smith, seconded by Mr. Lintner, it was—

Resolved, That the Association of Economic Entomologists heartily indorses the work of the committee from the Association of Agricultural Colleges and Experiment Stations, appointed for the purpose of consulting the manufacturers of spray machinery, with the end in view of securing the adoption of standard sizes of connections and attachments on such machinery.

Further, the Association of Economic Entomologists urges upon the manufacturers of this machinery the importance of acceding to the request of this committee. The Association requests the committee to publish its recommendations, with drawings and descriptions for the information of manufacturers and special workers, and to include in this publication a list of all manufacturers who have agreed to conform to the standard sizes.

Mr. Kellicott stated that in his opinion firms which will not comply with the request to manufacture standard fittings should be requested to furnish an adapter to their machines which will enable their use with the standard fittings.

ENTOMOLOGICAL WORK IN CENTRAL PARK.

BY E. B. SOUTHWICK, NEW YORK, N.Y.

[Author's abstract.]

The work of the entomologists of the department of public parks is in the care of trees, shrubs and plants, under the directions issued by the president of the board of commissioners.

The work of removing the egg masses of *Orgyia leucostigma* was the first done in this department, when twelve men were employed to clean the trees, benches, walls, and stonework in the parks. The first autumn of our work we collected thirteen bushels of these cocoons and egg masses, leaving those cocoons that were apparently parasitized until the final cleaning. The large elms on the Mall were thoroughly cleaned with steel brushes made for the work, and each tree received a wash to destroy any insects that might be in the crevices of the bark. This work of collecting (and burning in the furnace) has been carried on each year as the force would allow, in this way keeping them in subjection. We now treat them in four different ways :

(1st) By hand-picking, of which bushels are each year taken from the trees with tools especially adapted for this work.

(2nd) By jarring the larvæ down with a pole, so arranged that a blow from a mallet on a projection placed at the large end of the pole will jar any down that may be on the branches. With a sudden blow most of them will fall to the ground, where they can be crushed.

(3rd) By poisoning the foliage wlth London purple, which is quite effective and used especially on very large trees that can not be treated otherwise.

(4th) By poisoning or spraying the trunks of large trees with an emulsion of petroleum and carbolic acid. This penetrates most of the cocoons sufficiently to kill the inmates, the disadvantage being that it kills the parasites too. This method is only resorted to when the egg masses are very numerous and we are short of help, and as a means of reducing the next brood. Large numbers of trees were so treated this season to arrest the late summer hatchings.

The next insect in abundance and destructive working was the Bag Worm, *Thyridopteryx ephemeræformis.* Whole portions of the parks were literally stripped of their foliage ; many of the trees on the drives were nearly as bare as in winter. So abundant were they that the branches were strung with their cases, and with one push of the instrument prepared for collecting them, a handful of these cases would be taken. Four kinds of tools were made for this work, and the cases were collected and destroyed. In this way nearly twenty-two bushels have been collected and destroyed.

The *Datanas* have always been abundant in the parks, and as many as fifteen pounds of caterpillars have been taken from a single tree. These are collected while massed, as is their habit, and then destroyed.

Hyphantria cunea is very abundant in our parks and has been destroyed by cutting down the webs as far as was possible. If the tree was too valuable, they have been twisted out with poles made especially for this work. In some cases spraying has been resorted to, but as this does not remove the unsightly web, the most practical thing to do is to remove the whole colony.

Clisiocampa americana has this year appeared in our parks for the first time, and in great abundance. The webs that appear on the trees before they are in full leaf can be easily removed, and in this way the finer trees can be protected. The eggs are also removed in the late autumn and winter, as they are very conspicuous.

Vanessa and *Grapta* sp. are sometimes very abundant, and are collected and destroyed as soon as discovered. *Cecropia* and *Eacles* are always abundant and on many of the smaller trees do much damage. These are hand-picked and destroyed.

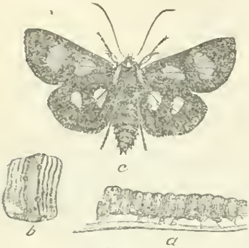


Fig. 17.

Alypia octomaculata (Fig. 17) is one of our most troublesome caterpillars, the great abundance of *Ampelopsis* vines in the parks, and especially around it, covering "squatter sovereignty" houses, affords congenial food for its rapid propagation. In the parks the vines are twice annually treated with a solution of London purple, applied with a spraying machine. This is found most effective and the vines do not seem to be injured as easily as most plants by the arsenites.

The Elm Beetle, *Galeruca xanthomelæna*, has given us an immense amount of trouble, and many thousand trees have been sprayed each year for their destruction, and with good effect. The means we have adopted during the past three years is rather more in the preventive line. As soon as the first eggs are found that part of the tree is at once sprayed. I am inclined to think the Elm Beetle is double-brooded with us.

The Elm Borer, *Zeuzera pyrina*, is getting to be very destructive with us, already twelve species of trees and shrubs are affected by it, and during the past year two men were kept during May at collecting the larvæ from broken branches. All branches as soon as detected in a weak or broken state are removed and the larvæ extracted. In very choice trees the limbs are carefully examined and where holes can be found bisulphuret of carbon is put in with an oil can and putty put over the hole. This is only resorted to in the case of rare trees and shrubs.

For scale insects the trees are washed with preparations and then cleaned with steel brushes, leaving all in fine condition. Many thousand trees and shrubs have in this way been put in fair condition.

A large number of poisons have been experimented with for *Aphis* and other insects, due notice of which will be given in reports soon to be published.

The spraying machine used by the department of public parks is a two-barrel machine manufactured by the Nixon Nozzle Company, Nixon, Illinois. This machine, to better adapt it for city work, has been entirely remodelled. A set of strong cab-wheels, with a strong axle, was first made, then a pair of strong easy springs, so as to make the tank less liable to jars. The tank was lined with zinc entire, and on top of the tank was placed a well about a foot high to keep the liquid from flushing over. On the rear of the tank was placed a box for poisons, hose, etc., and on the front a box for coats, lunches, and collecting cases and bottles. On one side of the machine and running nearly to the horse's breast was placed the bamboo pole used to elevate the hose and on the other side long handled pruning shears. Thus equipped the men drive all over the city and are at any time or place ready for work at short notice.

Our parks comprehend nearly 4,000 acres, and are from one extreme to the other sixteen miles apart. The work with the present force and appliances is chiefly centred in the island parks and places.

SOME HISTORIC NOTES.

BY A. J. COOK, AGRICULTURAL COLLEGE, MICHIGAN.

Upon special request, I am very pleased to state the following facts regarding the early use of the kerosene emulsion and of the arsenites.

I used kerosene and soap mixture, as I then called it, successfully in 1877. I used very nearly the same proportions that I prefer now, heated it to dissolve the soap, and I think made a permanent mixture. Dr. C. V. Riley argues that I only made a temporary mixture, which he says was made years before, although I have been unable to find the record. Whether it were an emulsion or not, it was very successfully used, as successfully as in later years. That I appreciated the importance of the *emulsion*, or even recognized it or produced it except as an accident, is not true. Messrs. Barnard, Hubbard, and Riley did this as the result of extended experimentation, and heralded the facts forth to the world, and I gladly accord to them the chief credit.

As to Paris green, I believe my friend Hon. J. S. Woodward, of Lockport, N.Y., was the first to announce it as a specific against the Codling Moth, which he did in the autumn of 1878. He relates to me that he advised a neighbour to use it to destroy the canker worms. The neighbour observed that the trees treated were very free from Codling Moth larvæ, and Mr. Woodward divined the cause. I had a very similar experience the same year. Mr. J. W. Taft, of Plymouth, Mich., came to me in 1878 with specimens of canker worms, which he said were destroying his orchard. I advised Paris green, which he used with the same results that greeted Mr. Woodward's neighbour. Mr. David Allen reported the facts to me. I said, "Can it be possible that the poison has worked this double benefit? I will test the matter." Mr. Woodward had already announced his belief in the matter. In 1879 I made the first careful test and proved by a most crucial test that Paris green was not only a specific against the insect but safe to use. The results of these experiments were given at the Boston meeting of the American Association for the Advancement of Science, August, 1879. The results which I then secured were remarkable beyond what may usually be expected or hoped for. This was because I treated a small tree and took special pains that every fruit should receive the poison. As great care to-day will meet with the same success. Thus while Mr. Woodward was the first to suggest and announce this remedy, I was the first to prove and announce positively that it is both safe and effective. So far as I know I was also the first to determine the best proportion—1 pound to 200 gallons of water—and to show that it is safe to pasture in an orchard at once after the poison is applied if the application is properly made.

AN EXPERIMENT WITH KEROSENE EMULSIONS.

BY HERBERT OSBORN, AMES, IOWA.

The most satisfactory method of preparing the valuable kerosene emulsion is desired by all, and a comparative test made this season may be of interest.

The first was a preparation in which the formula advocated by Professor Cook was carefully followed, using the hard soap and not the soft soap formula, the materials while still hot being thoroughly mixed with an egg beater.

The result was that we had what appeared to be an excellent emulsion, but in a glass jar we could soon see a separation taking place, the white emulsified part rising to the top and the water or soapsuds gradually increasing at the bottom. This continued until there was about two-thirds or a little more of soapsuds and one-third or less of emulsion above it.

While this at first could be readily mixed again a day later, the soapsuds in the bottom had hardened into a jelly that when mixed with additional water would but incompletely dissolve and the clots included caused great inconvenience by clogging the nozzle.

The other preparation, made according to the usual formula for soap emulsion (the Riley-Hubbard formula), emulsified and remained fixed with but a very few drops of soapsuds gathering at the bottom, even after days of standing, showing that the proportions were such that the soap water and kerosene balanced each other. This thickened to a buttery consistence, but dissolved perfectly in water, and only a trace of oil arose to the surface when thus mixed.

A microscopical examination of the substance prepared by Professor Cook's formula showed the buttery mass above to be apparently a good emulsion, and the jelly-like mass below to contain scarcely any traces of oil globules. A similar examination of the second preparation showed in different samples as usual a uniform emulsion.

I conclude that in the first case I formed an emulsion, that is, the oil was broken into minute globules and these coated with a film of soapsuds so that they did not coalesce, but that there were such an excess of soapsuds that the emulsion separated therefrom and rose to the top.

It is evident, I think, at sight that the preferable preparation is the one which combines the proportions so that no excess of either ingredient results, for, as indicated, the hardening of the thick soapsuds results in clots and these interfere with spraying, while to skim off the emulsion and leave the mass below is a useless labor and loss of material.

In the Riley-Hubbard formula we have evidently the exact proportions carefully determined, and I feel obliged to recommend this formula when giving advice to those wishing instructions as to preparation of kerosene emulsion.

A NOTE ON SILK CULTURE.

BY PAUL WALLACE, LOS ANGELES, CAL.

[Secretary's Abstract.]

The author reviewed the attempts which have been made to raise Silkworms in this country, and stated that they had proven the entire adaptability of the United States to this industry. He stated that all that was needed to make it a success was either a bounty paid by the Government or an import duty upon raw silk, but to his own personal knowledge attempts in this direction were thwarted by the work of large silk manufacturers who were bitterly opposed to the establishment of silk culture in America. He urged that the Association should use its best efforts to foster a popular sentiment antagonistic to such efforts on the part of the manufacturers of silk.

Mr. Lintner, in discussing this paper, contended that there is no question as to our ability to raise good silk, but that it will not pay. He spoke particularly of the work of the division of entomology in experimenting in this direction.

NOTES ON A FEW BORERS.

BY G. C. DAVIS, AGRICULTURAL COLLEGE, MICHIGAN.

If we go on the principle that "every little helps," even though it be slight and incomplete, then perhaps a few notes incidentally picked up on our forest borers may be of some utility at this time. Dr. Packard's work on forest insects, so recently issued, is of inestimable value to the working entomologist, but by the reporting of the few observations we happen to make while at our other work we can make the volume still more complete and helpful. Perhaps the habits of some of these species may already be known, but as they have not been specially reported in this work, reference is here made to them.

From the maple was reared the Cerambycid borer *Acanthoderes decipiens*. It was found as a pupa in the rude chip case just under the bark. The cylindrical burrow made in its exit extended well in toward the heart of the tree and through quite sound wood.

Another Cerambycid, *Leptura proxima*, was found quite numerous in blocks of hard maple sawed from the tree the winter previous. The grubs were quite large, and it was thought that they would pass through the transformations that season, but it was not until a year from the following May that the first beetle issued. From the data given it seems that the borer must require two or more years to reach maturity.

In "Forest Insects" Dr. Packard mentions *Lyctus striatus* under the list headed "Found in rotten oak wood; not known to be injurious." We have quite recently found them issuing from a red oak floor in one of our college halls. The floor was laid two years previous to the time of this appearance, and the lumber was seasoned at that time. The beetles issued from the sap wood only, and probably were feeding there when the tree was sawed into lumber.

In order to learn more of their habits quite a number were placed in a glass jar containing a branch of green oak, one of dead oak, and a seasoned stick from the shop. The beetles preferred the latter when first introduced, and made themselves at home by boring a hole entirely through it diagonally the first night. Mating took place in a few hours after issuing and eight days later ovipositing was first noticed. Mating again took place before each egg was deposited. This seems essential, as a female was placed by herself immediately after mating the first time, and, although watched for several weeks after the others had died, no sign of ovipositing was noticed. The branch of green oak was preferred in depositing the eggs, and none were placed on the stick from the shop. Ovipositing occurred about once in half an hour and lasted but one day. One week after oviposition young larvæ were found. We are in hopes to get the complete life history from them.

From the oak posts of one of our summer houses were taken quite a number of *Phymatodes dimidiatus* along with *P. varius*. Four different kinds of wood—elm, maple, hickory, and ironwood—besides the oak, enter into the construction of the chalet, but none of the others showed signs of borers, while the oak was well perforated. The species seem to work mostly just beneath the bark.

Two specimens of *Alaus oculatus* were taken in the trunk of a white oak near the partially decayed heart. A full-grown larva of this was also found in the trunk of a "sappy" aspen.

On the 10th of June a piece of bark was torn from an aspen (*Populus tremuloides*) that had but recently died, and under it signs of insect depredations were quite evident. Upon further investigation the bark and wood were found to be almost entirely separated. Underneath, the wood was yet sound and quite green. Here were found galleries penetrating almost to the heart, and in them were found *Enchodes sericea* in the imago stage, although some of them were yet in the pupa case and nearly as soft and white as a pupa.

These beetles belong to the family Melandryidæ, which contains a number of quite diversified genera that in general live on fungi or under bark. As far as their habits are known those living under bark do not seem to be injurious as borers, and whether we can consider this species as merely working in decayed wood or as a borer in green wood can hardly be decided by this one instance. It is certain that the larvæ are *capable* of penetrating sound wood.

The beautiful little Buprestid, *Pœcilonota cyanipes* was reared from the aspen. When found, June 9th, it was in the pupa state in the axil between the body of the tree and quite a large branch. So much had been eaten around the base that the branch was already dead. Mr. Harrington reports capturing the species on a dead willow stump, and Mr. Fletcher a specimen on a dead aspen stump in Ontario.

Galls made on branches of the willow, *Salix discolor* by *Agrilus torpidus* have been found quite common in certain districts near here, and in other districts was found *Saperda concolor* in galls equally as numerous. In no case yet noticed have the two been found in close proximity. The galls made by the Buprestid are an oval swelling of the live branch very similar to the one made by the Saperda. Inside there is a difference in the architecture of the home. While the Saperda remains mostly within the swelling and makes its exit through it, the Agrilus bores an oval gallery downward from the gall, sometimes in the pith, but oftener indiscriminately through the wood, and makes its exit often an inch and a half below. The imago issued about a month later than the Saperda.

From the Saperda galls were reared two specimens of parasites. One of these is *Pimpla pedalis* and the other belongs to the genus Bracon, which we have yet been unable to get named.

Galls on the willow also yielded us a few specimens of the handsome Sesiid, *Sciapteron tricincta*, as named by Professor Fernald. The galls did not differ in appearance externally from the others. Inside the gall a tunnel was made downward along the centre for an inch. The whole cavity was lined with a soft, delicate, though very strong, buff cocoon, and undisturbed in this silken bed the larva passed through its transformations to the moth.

From *Hylesinus acuelatus*, the Ash Scolytid, was reared a species of Bracon, pronounced by Mr. Ashmead as probably a new species.

From a species of trefoil, *Ptelea trifoliata*, was reared a species of the Tineid genus *Hyponomeuta*. Wherever the shrub was found the thin white web was quite common early in the spring before the leaves were out. These webs were always at the terminal portions of the green shoots. The caterpillars, entering the stalk usually at the terminal bud, would bore down through the pith some three to six inches in the shoots connected by the web. The larvæ seem to remain in the stalk only part of the time, but spend the remainder of the time above in the web. The twigs, of course, are killed down as far as the larvæ go, which greatly mars the symmetry and beauty of the bush. This habit of boring is probably a generic characteristic, as several European species are mentioned as having similar habits.

THE POPLAR GONIOCTENA.

BY A. J. COOK, AGRICULTURAL COLLEGE, MICHIGAN.

The past spring the poplars about the Michigan Agricultural College were seriously and extensively defoliated by a Chrysomelid beetle, *Gonioctena pallida* Linn. The larvæ were first found in early June, so that we did not have the eggs. The larva is much like the Elm-leaf Beetle in form and colour. The beetles appeared June 21. They are yellowish brown, except the eyes, epicranium, two horn-like spots, and a central oval spot on the posterior portion of the prothorax, the scutellum, two large spots, one on each elytron near the scutellum, two nearly as large rounded spots near the suture, and just posterior to the centre, three small spots along the lateral margins, and the entire underside of the body except a narrow margin, which are black.

The beetles came forth late in June, but we found no larvæ or eggs.

NOTES OF THE SEASON FROM SOUTH DAKOTA.

BY J. M. ALDRICH, BROOKINGS, S. DAKOTA.

Cutworms have been more injurious than ever before. From limited data, I judge that the loss in the State reaches several millions of dollars. Corn, flax, gardens, and other crops suffered about in the order mentioned.

At our station the large Willow Sawfly (*Cimbex americana*) is much less injurious than for several years. I have reared six or seven species of parasites from it, four of them being numerous.

The Cottonwood Leaf Beetle is with us in large numbers, as usual. Our experiments in spraying with arsenites for this insect are more successful than heretofore, and I now feel confident that it can be controlled (though not exterminated) by this method. Our new Russian poplars, so desirable in other respects, are chosen by the beetle in preference to cottonwood.

Gooseberries have suffered from a combined attack of the Spanworm (*Eufitchea ribearia*) and the Sawfly. I have not observed the latter in our State till this year.

The Ash Borer (*Trochilium fraxini*, Lugger) is still increasing rapidly, and will probably destroy most of the ash trees in the neighbourhood of the station in two or three seasons more. The Ash Sawfly and the Sphinxes (Ceratomias) are assisting to a noticeable extent. The ash is a bad investment in our locality.

In May the station procured five colonies of bees, aiming merely to see what they would do, with ordinary care, in a region devoid of natural timber with its accompanying honey plants (the nearest is five miles away). We have now increased to ten strong colonies. I have taken off 35 pounds of fine honey, and shall probably get 100 pounds or so of fall honey. Considering that the original swarms were weak, I think the record good so far. Of course the winter will try them.

A building 16 by 32 was erected this year for our department. It has a wing 12 feet square for bees. In the main part we have an office and a small breeding room. We moved into the new quarters July 1.

A NOTE ON REMEDIES FOR THE HORN FLY.

BY WM. B. ALWOOD, BLACKSBURG, VA.

This plague to cattle, which has now become so common throughout several of the Atlantic coast States demands attention from workers in economic entomology. Doubtless some very good recommendations have been made by Dr. Riley, Professor Smith, and others, but as conditions vary we are bound to treat such questions from the standpoint of local practicability. The recommendation to lime the droppings when practical may prove a very good way of dealing with this pest, but with me it is quite impractical from the fact that lime is neither cheap nor easy to procure, and this is the case in many parts of Virginia.

Some two years since, from a suggestion of mine in a lecture at Charlottesville, Va., the late Henry M. Magruder began the use of kerosene emulsion on his dairy cattle. The application was made with a Japy knapsack pump, and though it had to be repeated with frequency, proved a considerable success. During the year 1890 I frequently recommended this remedy, stating that the standard emulsion (Hubbard formula) should be diluted ten to fifteen times.

The Horn Fly did not become troublesome at our place, which is in the upper mountains of southwest portion of the State, until late in 1890, and I did not as a consequence, have opportunity to treat this insect myself. However, the present year they showed themselves in abundance in July, and I concluded to try my own recommendations.

The experiments were made upon ten dairy cows, beginning with plain emulsion diluted ten times. I found that this killed a majority of the flies actually wetted with it and produced considerable immunity from attack for the space of one or two days. Desiring to make the treatment more effective, I used as diluent a water extract of tobacco waste, made by thoroughly boiling one pound of tobacco in each gallon of water. This used with emulsion, 1 to 10 parts, gave almost perfect immunity for a period of three days.

My work shows that two treatments with this preparation per week almost entirely relieve the cattle from annoyance. I make the application with a knapsack pump fitted with a cyclone nozzle. The work is most conveniently done just after milking in the morning. Two men treat the cows rapidly, requiring about one minute per cow, and using from one to two pints of liquid. The preparation as given above causes no particu larly unpleasant odor, and thus far the milkers have made no complaint whatever concerning its use on cows.

The President announced that he had received letters of regret from Mr. J. H. Comstock, Mr. C. W. Hargitt, Mr. H. Garman, Mr. C. P. Gillette, and Mr. C. H. Tyler Townsend.

On motion of Mr. Alwood, seconded by Mr. Smith, it was resolved that Mr. Riley be requested to publish the proceedings of this meeting in *Insect Life*, and on motion of Mr. Smith, seconded by Mr. Bruner, the Secretary was instructed to send an abstract of the proceedings to the *Canadian Entomologist.*

On motion of Mr. Southwick, the Association passed a vote of thanks to Mr. Riley and the members of his office force for the courtesies to members during the meeting of the Association.

On motion of Mr. Osborn, a vote of thanks was extended to the President for his able efforts to make the meeting a success.

The Association then adjourned.

L. O. HOWARD,
Secretary.

Just after the adjournment of the meeting the following communication was received from Mr. Snow, one of the vice-presidents of the Association, which, although it can not properly be incorporated in the minutes, may be properly appended here:

THE CHINCH BUG DISEASE AND OTHER NOTES.

BY F. H. SNOW, LAWRENCE, KANS.

In response to your circular letter asking for notes of work done in economic entomology during the past year I beg to submit the following brief and incomplete account of the work done in Kansas this year under my direction in the matter of the artificial dissemination of a contagious disease or diseases among chinch bugs:

The legislature of the State of Kansas at its last session in the winter of 1890-'91 made an appropriation of $3,500, available during the years 1891-'92, for the purpose of carrying on these experiments. With this money I have been enabled to largely increase the facilities of my laboratory and to conduct on a rather extended scale practical experiments in the field. According to a provision in the act of appropriation, I am required to make a monthly report to be printed in the official State paper of Kansas, the *Topeka Daily Capital.* From my last report, made on July 15, I quote as follows:

Since making the last report, June 15, the wheat has ripened and mostly been harvested. The chinch bugs at harvest time left the wheat fields and invaded the fields of young corn. The experiments of 1889 and 1890 were carried on among bugs in the corn fields, and the experiments of this year in wheat fields are thus new features in the work. The results have been gratifying, but the reports from this year's corn fields and the investigations of my field assistant, Mr. Hickey, show that the massing of the bugs in the hills of corn offers more favorable conditions for the successful workings of the disease than the usual conditions incident to the presence of bugs in wheat.

The hatching and appearance of the young bugs is a feature in the work added since the last report. It is with satisfaction that I note the evident communicability of the disease from old to young bugs by contact. The young bugs are as susceptible to the infection as the old ones.

The part of the State reporting bugs in the corn fields lies between 96° 30′ and 98° 30′ west longitude; or between a line drawn through Marshall, Pottawatomie, along the eastern boundary of Geary, Morris, Chase, and along the eastern boundary of Greenwood, Elk and Chautauqua Counties, and a line drawn along the eastern boundary of Jewell, Mitchell, Lincoln, Ellsworth, Rice, Reno, Kingman, and Harper Counties. This bug-infested belt extends clear across the State from north to south. Scattering reports of the presence of the bugs are in from various eastern counties, and from a few west of the 98° 30′ line.

Up to date (11 a.m., July 15) infected bugs have been sent out from my laboratory to 1,700 applicants. To several of these applicants second lots of infected bugs have been sent, owing to failure to use the first lot for various reasons, and occasionally because of failure to get good results from the first experiment. But as many, if not more, persons have got dead bugs from fields wherein the bugs are dying because of infection sent out from my laboratory as have received bugs directly from me. Each successful field experiment has been the means of establishing a secondary distributing centre. It is evident that the experiment of killing chinch bugs by infection with fungoid and bacterial disease is being given a trial on a large scale. The reports for the past month (June 15 to July 15) have been gratifying, in that they show a good percentage of success. However, reports are not made out as carefully as they should be, and worse, many experimenters make no reports. I desire to have a report on every lot of infected bugs sent out.

Because of the difficulty of getting careful reports from the field, I sent out Mr. E. C. Hickey, an intelligent university student doing special work in natural history, as a field agent. Mr. Hickey's last trip was through Chautauqua, Harvey, Sumner, Cowley, Butler, Greenwood, and Elk Counties, lasting from June 12 to July 6. He visited seventy-two persons who had experimented with infected bugs, and found over 80 per cent. of the seventy-two experiments successful. Mr. Hickey personally visited the corn fields, and verified by careful observations the statements of the farmers.

The laboratory facilities for sending out infected bugs have been largely increased, and all demands can be promptly met. Application for infected bugs received in the morning's mail are answered with bugs and directions on the noon outgoing trains. The work of scientific investigation in the laboratory is going on steadily and carefully. Inoculation experiments from pure cultures of Sporotrichum will be reported on next month. A feature of the work unnoticed previously in this report is the prevalence of Empusa, the fungus with which the first successful experiments were conducted. Empusa and Sporotrichum develop side by side in the infecting cages, and dead bugs sent in from fields where the bugs are dying show both fungi. At the close of the season I hope to present a full report of the laboratory investigations, which the brief monthly reports offer no space for. Prof. S. A. Forbes, the eminent State entomologist of Illinois, who has experimented in his laboratory on the development of parasitic fungi in insects and who early noted the bacterial disease of the chinch bugs, visited my laboratory last week. He expressed the hope that a series of field experiments such as are now being carried on in Kansas could be conducted in Illinois.

In closing, I may say that the outcome of the work so far this year is highly encouraging.

Since making this report the requests for infected bugs have grown much less numerous. The laboratory experiments have been carried on with more attention paid to bacteria. So far I have been unable to successfully infect bugs in the laboratory from pure cultures of Sporotrichum. The Sporotrichum grows readily on a medium composed of beef broth and Irish moss, and pure cultures are easily obtained. Other experiments with these cultures are necessary, however, to make this statement positive. Empusa will not fruit on the plates. It behaves very peculiarly. Long erect filaments are sent out strikingly different from the customary hyphæ, but no spores are produced. As regards the bacteria, I am assured that the forms in my cultures are identical with Burrill's *Micrococcus insectorum*, two slides of which have been furnished me by Professor Forbes. This Micrococcus is found almost without exception in bugs which have died in the field and been sent in for examination. Another Micrococcus, larger and almost perfectly circular in optical plane, is often present in dead and dying bugs. Spraying experiments with fluids containing this Micrococcus give no successful results in infection.

I am not in position at present to make a full report of the season's work in the field and laboratory. This report I shall make late in the fall.

* * * * *

Other injurious insects besides the chinch bug in Kansas especially noticeable this year were the Hessian Fly, in about the same abundance as usual. Much damage is annually done by this pest. The Wheat Straw Worm (*Isosoma tritici*) was reported from a dozen or more counties of the state in June. It occasioned considerable alarm and really did some damage to the wheat in central and western Kansas. I received reports of the presence of the worm from twenty-seven correspondents. It appeared in wheat which had been planted on stubble ground, though the state of affairs shown in one or two reports contradicted this general condition. One correspondent reports the worm in wheat planted on sod ; another in a field of 40 acres new ground, only grown to wheat once before, plowed last fall and after the wheat had come up fed off so close that the field looked quite bare. The Wheat Head Army Worm (*Leucania albilinea*) was reported in June from a few fields. However, little damage was done.

An attempted grasshopper scare was put down by a little investigation. Grasshoppers were reported to be in immense numbers in eastern Colorado and overflowing into Kansas. I made a trip to the infested region and found the grasshoppers to be a local species (*Dissosteira longipennis*) which was in great abundance over about 300 square miles of country near Arriba, Colo. Of course, no danger to Kansas was to be feared from these locusts. Arriba is 70 miles west of the Kansas line. The limits of the infested area extended approximately from Limon 16 miles east, 9 miles north, 7 miles west, and diagonally southeast to Hugo, 15 miles. Within this area the two favoured grasses of the range, buffalo and gramma grass, were eaten to the ground. The swarms when visited (July 17) were almost entirely composed of pupæ. Reports agree that the eggs from which these swarms were hatched were deposited last fall by the locusts which flew into this area in August and September from the south. And by observations during my trip and by regular reports received since then I discovered that the locusts as fast as their wings were acquired were flying south. Whenever there was a favouring wind from the north the winged individuals would rise high in the air and fly directly southward, having massed in great numbers along the southern boundary of the infested area. When the wind was from the south, however, no flying would be indulged in.

The rate of progress of the army of immature locusts was northward at the rate of 9 miles in about two weeks ; eastward at the rate of 2½ miles in 12 days. Over the face of the country traversed by the hosts the ground looked bare and brown, owing to the almost complete destruction of the grass leaves. When the devouring multitudes were at work upon the grass the noise of the grinding of their jaws was distinctly audible as a well-defined crackling sound. About the station of Limon the hogs of the town were fattening upon the locusts, which also furnished food for turkeys, chickens and hawks.

ENTOMOLOGICAL CLUB OF THE A. A. A. S.

The Entomological Club of the American Association for the Advancement of Science, held its annual meeting at Washington, D. C., August 19-22, 1891, the President, H. Osborn, of Ames, Iowa, in the chair. This meeting was one of the most successful ever held both in point of attendance and interest ; seven sessions were held, at which forty-two persons were present, the average attendance being twenty-two. The Entomological Society of Ontario was represented by its Vice-President, Mr. James Fletcher, of Ottawa. A full official account of the proceedings has been published in the October and November numbers of the *Canadian Entomologist* (1891) to which the reader is referred.

THE NORTHERN MOLE CRICKET. (*Gryllotalpa borealis*, Burm).

BY JAMES FLETCHER, OTTAWA.

The above-named and most interesting insect is I believe rare in Canada, as I have for some years endeavoured unsuccessfully to obtain Canadian specimens. Good luck, however, has at last favoured me. During the month of September last I was much pleased to find amongst several packets of "live-stock" sent in for identification, one containing a fine living female Mole Cricket. This was sent by Mr. W. W. Hilborn, who had caught it in his garden at Leamington, in Essex county, Ont. My correspondent stated that the insect was the first he had seen, and that none of his neighbours knew it.

Upon opening the box carefully an exceedingly active seal-brown velvety creature was seen to burrow down out of sight beneath the light earth with which the box was half filled. The contents of the box were then emptied into a tall glass jar, which I keep for the purpose of examining strange or refractory prisoners when they are first sent in. I at once recognized my visitor as the long looked for mole cricket, and my pleasure was much enhanced by finding it a far more beautiful and interesting creature than I had anticipated. The only way to understand the habits of insects properly is to study them in a living state, and the pleasure thus derived is so great that all who once begin this method of investigation soon become fascinated with it. The Mole Cricket seems to be easily domesticated, and I have now had this specimen in confinement for nearly three months in a glass jar in my office, and it is apparently in perfect health. From being nocturnal in its habits and passing nearly all its life beneath the surface of the earth, it is rather difficult to observe.

Its movements as it runs over the surface of the ground or over the hands are less insect-like than those of any member of that class which so far has come under my observation and remind one very forcibly of the movements of an otter. Its bright black eyes and the way it turns its head and looks up at you giving it a very animal-like appearance.

A few weeks after the arrival of the female another specimen was sent to me from the same locality, by Mr. George H. Mills, of Leamington. It had been found in a ditch which was being cut through a swamp, and it was stated that it had appeared to be perfectly at home in water, swimming with great ease. This proved to be a male but it had been injured in some way during its journey of 500 miles in the mail bag and died a few days after arrival. The Mole Cricket (Fig. 18) belongs to the order *Orthoptera*, which contains the grasshoppers, locusts, cockroaches, etc., and to the family *Gryllidœ* or crickets. It takes its name from its resemblance in burrowing habits to the small mammal after which it is called. For these habits it has its front pair of legs similarly modified so as to especially adapt them for digging. They are certainly the most remarkable feature about this insect and deserve special attention. They are short, but exceedingly strong. The tibiæ or shanks, which can be closed tightly into grooves on the thighs, are flattened and broadly triangular in shape, bearing on the lower edge four curved and hollowed claw-like projections, the outer two of which are distinctly articulated at the base. These digging "hands" are turned somewhat obliquely outwards like those of the mole, and this throws the tarsi or feet to the outside where they are attached to the shanks at about its centre. The feet are no less remarkable than the shanks; they consist of three joints, the first two of which are broad, flattened and claw-like, the first much larger than the second. These two joints lie obliquely in front of, and reach as far as the tips of the two articulated claws of the shanks, which undoubtedly strengthen them very much when in use. The third joint is small, oval in shape, and bears two weak, almost straight claws; this joint lies at the back of the first two and is almost hidden between them and the two corresponding claws of the shank. The other legs are comparatively weak and the hind legs are not formed nor strengthened as in other crickets for leaping, they are twice as long as those of the second pair; but ar only slightly swollen.

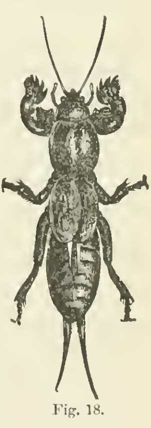


Fig. 18.

The female which is larger than the male, is a little more than 1½ inches in length from the front of the head to the end of the abdomen, and the antennæ and tail-bristles are each about half an inch more. The head is small, dark brown and moveable, the eyes oval, black and shining, and when the insect is alive the facets do not show by reason of their small size. Between these two compound eyes, but higher up, are two simple eyes or ocelli. Pro-thorax large and prominent and like the powerful fore legs which it bears is covered with a short velvety pile of a rich seal-brown with a golden reflection. The wing-cases are short, ⅜ of an inch in length, pale gray, broadly veined with black, somewhat oval* in outline, with a deflexed outer margin, and lie flat on the back. The wings themselves are also small and lie folded up like a fan beneath the wing-cases, the tips exceeding them in length by about ⅛ of an inch and reaching rather more than half way down the abdomen as two slender white bristles. The whole body is covered with a fine velvety down which is most conspicuous on the forelegs and the inner side of the shanks of the second pair of legs, there are also scattered over the body a few slender hairs 1½ to 2 mm. in length, which are most abundant on the tail-bristles. The female does not chirp and has no ovipositor. She is distinguished from the male by having no notched nervure on the wing-covers and having the nervures more regularly arranged. The females, too, have only 7 segments to the abdomen while the males have 8.

The habits of this little creature are strictly nocturnal, and it is possible after all that it may not be so rare in Canada as is supposed. Prof. Comstock says "It is not a common insect, but occasionally it is found in great numbers in a limited locality. It inhabits nearly the whole United States east of the great plains, from Louisiana to Massachusetts."

It lives in light moist ground, near streams, burrowing beneath the surface and seldom coming out except at night time. Prof. J. A. Lintner says (Rep. VI. 1890, p. 150) "it burrows into moist earth to a depth of 6 or 8 inches by means of its front pair of legs, which are admirably constructed for digging. Its eggs are laid in these galleries in a tough sac, to the number of from two to three hundred, within a chamber scooped out for the purpose. Here it feeds on such roots of plants as may come in its way. Occasionally these crickets occur in large numbers, when they may become very injurious, destroying grass and garden vegetables, and in one instance they are said to have nearly ruined a crop of potatoes. Their chirp differs from that of other crickets in being a dull, interrupted, jarring sound, which has been compared to that of the goat-sucker. The song of the male during the warm nights of early summer has been described as 'a low, continued, rather pleasant trill, quite similar to that of the common toad but more shrill.' Mr. S. H. Scudder has written at some length on the chirp of the Mole cricket, in *Psyche*, for October, 1885, 1. p. 105-6. He has written its notes and has described them as a guttural sound like *grü* or *grèèu* repeated in a trill indefinitely, but seldom for more than two or three minutes and often for a less time. It is pitched at two octaves above middle C."

The food of the Mole Cricket like that of the Field Cricket (*Gryllus*) seems to be both vegetable and animal. I have never, however, been able to see my specimen feed, and when worms or insects have been placed in its way it has shown fear, and either run quickly backwards or burrowed down out of sight, but Brehm in "Les Insectes" I. p, 448, gives the following of *G. vulgaris* the European species. The autopsy of a large number of Gryllotalpæ revealed along the whole intestinal canal, legs and antennæ, heads of ants perfectly recognizable. I easily kept some in captivity for several weeks in jars filled with mellow earth, and fed them with meal worms and mud worms, upon which they rushed eagerly, when presented to them with forceps." The Rev. J. G. Wood in "Insects at Home," says they relish raw meat.

The habits of the European Mole Cricket appear to closely resemble those of our Canadian species, and the following kindly translated for me by Prof. J. A. Guignard from Dr. J. Ritzema Bos's valuable treatise "Animals Injurious and Beneficial to Agriculture" (Tierische Schadlinge und Nutzsing fur Ackerbau, etc.) will give a clue to some points not yet observed with regard to our Northern Mole Cricket. There is a difference in the nature of the egg receptacle as stated by Prof. Lintner and Dr. Ritzema Bos.

---

* Less so than shown in the figure.

"Shape ungainly; feelers and testers (*palpi*) very long, as well as the tail-bristles. The forelegs are real digging legs and at first sight seem very much like the fore-paws of the mole. The thighs are broad and flattened, the legs likewise short and flat; bear inward five (*sic*) saw teeth. The joints of the foot are small; the foot is implanted on the outer edge of the leg and can be folded backwards. The two leathery fore-wings cover each other almost completely and the posterior wings only in part. The latter are mostly folded in the shape of a fan and lie on the back in the shape of two little tails. The Gryllotalpa is of a dark brown color."

"This insect lives generally in swampy ground containing some sand or clay, and besides in all kinds of soil rendered cohesive by much manure. Its occurrence is also local. It hybernates in a torpid condition; it leaves its retreat very early in the year. Its burrows may be found as soon as March, extending at a small depth under the surface of the ground. At the spot where the female intends to build her nest, the burrow slopes a little downward; the walls of the nest are hardened by pressure with the hard back, so that the nest can be extracted in one mass from the ground. The diameter of the nest is about 4 cm; the entrance is narrow and somewhat crooked. The number of the eggs varies usually from 200 to 250. They are not laid all at once; after having laid a little heap of eggs, the female leaves the nest and comes repeatedly back to it. The eggs are about the size of a rape seed, but are egg-shaped and yellowish. All the eggs in one nest are also not of a uniform size. One month after being laid they hatch; the young are at first white, but soon become brown above and dirty yellow beneath. On their emergence they are already of a shape similar to their mother's. The latter watches faithfully over her brood, remaining with her young until the last egg is hatched; meanwhile the nest is enlarged in size to make room for the growing insects, while at thé same time new food is laid bare in the roots successively uncovered."

The young grow rapidly, and after the first moulting remain still under the care of their mother; they may then go out of the nest, but never to any great distance. They can only after the second moult do without the mother's care and begin their independent life. The third moult follows in October or November, they then bury themselves, still without their wings, in their winter qnarters.

The fourth moult takes place in April or May next, when the wing cases appear, and after the fifth moult, in May or June, the Gryllotalpa attains its full size and has become an adult winged insect. From what precedes it follows that it requires a whole year for its evolution.

The Gryllotalpa lives in orchards, gardens, meadows, even in nurseries and woods, and is everywhere equally destructive. Generally it prefers dry ground to wet ground, without altogether avoiding the latter. It gnaws the roots of various plants, and not a single plant can be named which it does not attack; it does not even spare the roots of fruit or forest trees, though preferring herbaceous plants to the harder roots of trees. Consequently when the Gryllotalpæ are very abundant they do considerable harm. Witewaall, a skillful Dutch farmer, writes as follows on the subject: "In a vegetable garden the damage by the Gryllotalpæ was constantly very great; the owner paid his men a penny for every captured specimen. One day, after very hot weather, it rained heavily, so that the garden was partly flooded. When the water had been absorbed by the ground the men went on to a plot where cabbages were severely damaged by Mole Crickets. The plot was dug up, and on a surface of two-fifths of an acre there were obtained 1,400 full grown Mole Crickets.

"This insect burrows close to the surface of the earth, and in so doing raises somewhat the surface after the same fashion as the Mole. Young plants are thus raised out of the ground, and older ones also die when the Mole Crickets burrow amongst their roots. In vegetable gardens whole rows of peas in a bed are often seen to die suddenly as a result of the operations of a single individual. Over the nest all plants wither. In short this insect must rank as one of the most injurious, and the opinions of those authors who consider Mole Crickets injurious only on account of their burrowing and not on account of the injury they do by gnawing the roots appear to be quite mistaken. In such localities as Mole Crickets occur abundantly the roots are gnawed off to such an extent that plants can be raised up by the leaves."

Besides the above a great deal of interesting matter concerning these insects is to be found in Westwood's "Modern Classification of Insects." It is there stated that "of all vegetable food they prefer potatoes; but if raw meat were offered them they attacked it in preference to anything else with great greediness. Gould also states that he fed a Mole Cricket for several months on ants."

Remedies.—There would seem to be no doubt that where these insects occur, as is sometimes the case, in large numbers that they cause serious injury to crops. The best remedy would probably be poisoning the adults either by dipping slices of potato or raw meat in some mixture containing arsenic, as White Arsenic, Paris green or London purple, and then placing these in or near their burrows. In Germany, where they are often abundant, says Dr. Bos, "The best remedy is the destruction of the nests, preferably in June. These are sought for in spots where the plants are dead and weakly. The nest must be carefully taken out whole when its presence has been ascertained by the finger.

Flower pots with their holes plugged may be used as traps by burying them in the ground so that their edge be on a level with the burrows.

The insects pair in the spring, and in early summer they may be entrapped in glazed pots partly filled with water and sunk up to their edges in the alleys between the beds.

Pouring water in the burrows has also been recommended, and the Mole Crickets are then killed when they have thus been driven out, but I doubt the efficiency of this method, as the insect has more than one entrance to its retreat.

Finally, horse manure may towards winter be thrown into ditches between the beds of vegetable or flower gardens. The Mole Crickets like warmth; they can thus be enticed into the manure and then killed."

The figure (18) used above has been kindly lent to me by Prof. J. A. Lintner, and is the same as was used to illustrate the article cited in his Sixth Report.

NOTES ON JAPANESE INSECTS.

BY W. HAGUE HARRINGTON, OTTAWA.

My absence from Canada during the past summer interrupted my studies of our own insects, and has prevented me from preparing any paper upon them. I venture, however, to offer a few observations of a general character upon the insect fauna noted in my somewhat extended travels in the Sunrise Kingdom; my object being briefly to indicate wherein the fauna of that country more closely resembles, or differs from, that of Canada. Leaving out the many small islands which stretch far to the north and south, we find that the four large ones (Yezo, Hondo, Shikoku, and Kiushiu) which constitute Japan extend from 31° north latitude to 45° north latitude, or in other words, from the latitude of New Orleans to that of Ottawa; the capital, Tokio, (and Yokohama) being in the latitude of Cape Hatteras. This extent of one thousand miles from north to south affords room for much variation of climate, which is further greatly influenced by the Kuroshiwo or Black Stream (the Gulf Stream of the Pacific), and by other currents flowing along the coasts and between the islands. The country is also intersected by many mountain ranges, and has many lofty peaks, some of which are active volcanoes. The naturalist may find in a few hours' climb upon one of these mountains almost as great a range of vegetation as if he travelled to the northern extremity of the empire. As an instance of such changes in the flora I may mention that in a trip from the railway station at Gotemba to the summit of Fuji-san the first four miles of our road ran through fine cultivated fields with a light soil composed largely of fine ashes thrown out by the volcano in past ages. Then from the village of Nakabata there was the same distance over a plain covered with wild grasses and flowering herbs, intermixed with shrubs and a few stunted trees, the soil composed more largely of ashes and getting coarser as we advanced, and with thinner vegetation. Then the ascent became more abrupt and we entered a wide belt of forest containing many varieties of trees, but none of large size. Further up there were shrubs, grasses, etc , many of them in flower and attracting many insects. A few species of plants went far up the ashy slopes, probably to a height of 10,000 feet.

Although I do not intend to give lists of the insects or to enter into particulars regarding the dates and localities of those captured (a few of which I have brought for your inspection), it may still be convenient to refer separately to the members of the various orders.

Neuroptera ; Pseudoneuroptera.—Walking up the Bund on the morning of the 12th of August, having just landed by sampan from the good ship Empress of India, I was at once interested in the number of dragon-flies, of two or three species, which darted to and fro along this fine promenade. The profusion of Odonata then indicated was noticeable throughout the country, and was doubtless due to the abundant opportunity for breeding offered by the wide-spreading rice-fields. These are always kept submerged, or at least partially so, and in addition there are numerous ponds and myriads of irrigation channels cutting the plains in all directions. Many of the species of Diplax, Calopteryx, Libellula, etc., were very handsome, and I much regret that I was able to bring back only a few examples, and these of the common species. The insects are called by the natives *tombo*, possibly from their hawk-like flight, as the name for the large kite which is so abundant near the cities is very nearly the same, viz., *tombi.*

Many other neuropterous insects were observed, with species closely related to those which occur in Canada, such as Caddis-flies, Laced-winged flies (Chrysopa), Scorpion flies (Panorpa), which were very common, Chauliodes, etc. Near Yokohama I twice obtained with sweeping-net several young specimens, about one-eighth of an inch long, of the curious larvæ (in shape like miniature stag beetles), of Ascalaphus, which is a relative of the ant-lions, but could not determine on what plants they had been, although I made a careful examination of the foliage. A species of white ant is quite abundant.

Orthoptera.—Of both terrestial and arboreal grasshoppers (Jap. *Batta* or *hata-hata*) large numbers were observed. The former are especially numerous in the cultivated plains, and upon the grass-covered mountains and wastelands such as occur in the Hakone district. The name *inago* is given to a species which is known as the rice-locust, and which is reported to do serious damage to the principal crop of the empire. One very common, yet striking, grasshopper was a slim, bright green species, nearly four inches long when fully grown ; the head being elongated and the antennæ flattened. The outline of the insect is that of a blade of grass and the insects are very difficult to see when they are at rest among the grass, even on a closely cut lawn. Some specimens (apparently a variety of the same species) had a row of white dashes along the wing-covers and frequented grasses with such markings upon the blades. Along the paths between the fields and on the grassy hills I saw great numbers of a very large robust grasshopper, resembling very much the big American species called *Acridium americanum*, but belonging probably to a different genus. These large voracious insects must devour an immense amount of vegetation.

Very interesting both in appearance and habits, were the numerous members of the katydid and tree-cricket tribes, the dwellers in the trees and shrubberies, whose notes were very often piercing and prolonged. One large species was very frequently kept in little bamboo cages by the natives, but I cannot say that its song was very pleasing, although there was plenty of it. A pair kept near my brother's house used to shrill for long periods each evening, producing a noise which I at first took for the running of some machine, so loud and monotonous was the prolonged strain.

Another conspicuous insect was a large species of Mantis (Jap. *Kamakira* or *toro*) which was quite abundant. I frequently saw them devouring grasshoppers and other insects. The curious insects known as walking-sticks were abundant, as in this country, upon oaks, etc., and looked much like our species in the immature stages, in which alone I observed them.

Of crickets (Jap. *koriji*) there were big fat fellows in scores under any heap of weeds or rubbish; and cockroaches (Jap. *abura-mushi*) scuttled about the houses, which are sometimes much infested by them.

Dermaptera.—In Canada this order is represented only by the small and very rare *Labia minuta*, which is probably known only to entomologists. In Japan, however, earwigs were very numerous and swarmed among dead leaves, etc., and especially along the beaches among the windrows of cast-up sea-weeds. Some resemble greatly in appearance our own rare little species and probably belong to the same genus.

Hemiptera.—The Japanese name for bugs appears to be the same as that applied to insects in general, viz., *Mushi.* The bug *par excellence,* that species which, in not very remote regions of this country, makes the wooing of sweet sleep often more of a necessity than a luxury, is said to be unknown in Japan, and I certainly did not meet with it in any of my travels either on land or water.

The ponds and ditches contained water-bugs very closely resembling our species, including a Belostoma like the big water-bug which is seen so frequently upon our sidewalks since the introduction of the electric lights. Of terrestrial Hemiptera there were numerous species of Reduviina, Capsina, Lygæidæ, Alydina, Pentatomina, Scutelleridæ, etc., some of the phytophagous species of which were so abundant that they must have done serious injury.

The members of the sub-order Homoptera were, however, much more noticeable because the large species of the Cicadidæ made such an outcry during the hot weather that the most indifferent person (unless afflicted with deafness) could not help being aware of them. The most vociferous species was a large smoky-winged Platypleura that was very abundant in Yokohama, and sent forth his loud, shrill *me-me-me* from every lawn and grove. There were also three or four clear-winged species of Cicada, with lusty voices which joined in the concerts, and added noise if not melody. The children caught numbers of these big bugs by means of slender bamboos with a little rice glue on the tip, and were very expert at getting them from their resting places in the trees. They also caught in the same way dragon-flies, for what purpose I know not, and an apparatus of this kind might often be of use to an entomologist for bringing down insects from otherwise inaccessible situations. The Japanese name for the Cicada is *Semi*, probably in allusion to its shrill notes.

Several species of small Fulgoridæ were taken, but I did not see any of the large Lantern-flies such as occur in China. A bright green species about two-thirds of an inch long was common, both young and full-grown, on lawn shrubbery. There were also various tree-hoppers and frog-spittle insects, of which some were very prettily marked and coloured. These were closely allied to Canadian forms, but there occurred also abundantly a handsome little insect belonging to the sub-family Ricaniida, which is unrepresented in North America. This pretty insect looks more like a little butterfly than a bug, as the wing-cases are expanded and held horizontally. They are of a brown color, with two transparent bars, and when the insect is alive they are covered with a rich irridescent bloom, and have each a sort of eyespot near the margin. Unfortunately the fine powdery coating rubs off very easily, so that my specimens have lost the greater part of their beauty, and do not so much resemble lepidoptera. A beautiful green bug, looking like a small moth with drooped wings, occurred in great numbers, at times forming a regular fringe on the stems of plants. When disturbed they slipped very cunningly around to the opposite side of the twig. This species belongs to the genus Ormenis.

Coleoptera.—Beetles are well represented in Japan, some of the species being exceedingly, and destructively, abundant. Many of the species are very large and handsome in comparison with those of the more boreal fauna of Canada, which is especially noticeable in such families as the Scarabæidæ and Lucanidæ.

Of tiger-beetles there was a very brilliant species, which was abundant near Yokokawa (about one hundred miles inland from Yokohama), and also at Chofu, near the Western entrance to the Inland Sea. It was of a rich green and blue colour with bands of ruddy gold or bronze across the thorax and elytra. Upon the upper slopes of Fuji (at perhaps 8,000 feet of altitude) I obtained several specimens of a Cicindela which was of the dark colour of the ashes among which it lives, and could be seen only when it was in motion, so closely did it agree in colour with the ground. The same species also occurred upon the volcanic mountain Asama, the slopes of which are likewise of dark ashes and scoriæ.

Of Carabidæ I captured very few specimens, but received several fine species from my brothers. I have seen no Carabids corresponding to our large species of Calosoma and only one Carabus, but some striking specimens of Damaster occur. These are elongate black beetles, with the elytra resembling those of some tenebrionids (Blaps), but with the thorax much elongated, and the legs very long, so that they must be able to run rapidly. Only one living specimen was seen by me. The other carabids observed were mostly Harpalus, Pterostichus and Amara.

Water beetles closely resembled Canadian ones and among them was a large Hydrophilus like *H. triangularis*. Staphylinidæ seemed to be very rare, and of carrion beetles the most common species was a large black Silpha. Coccinelidæ produced some very pretty "lady birds," but very few of the species were abundant.

One of the most brilliant beetles obtained was a fine green buprestis (a species of Chrysochroa) which is found not uncommonly in the mountainous regions of Nikko and Hakone, and probably infests the giant conifers which grow there so plentifully. In the same district occur fine species of Chalcophora, of which one is much like the *C. fortis* which lives in Canadian pine trees. The only other buprestid observed was a small species which occurred plentifully on grasses and flowering shrubs, and which is much like a small Brachys.

Of all the Coleoptera observed, the most tropical in appearance as well as the most bulky, was a giant Scarabeid (*Xylotrupes dichotomus*) which occurs abundantly in the districts above mentioned, and probably inhabits decaying specimens of the big trees. The male of this fine insect has upon his head a long horn, flattened and forked at the tip, and a shorter, notched protuberance upon the thorax, in which the long horn can rest when the head is raised. The beetles vary considerably in size, and large ones will measure two inches in length, and more than an inch in width; the horn on the head being one and one quarter inches long. The family Scarabæidæ was also rich in the flower-loving Cetonians, some species of which were so abundant as to be very injurious to vegetation. A green species about half an inch long swarmed in the fields near Yokohama, and destroyed especially the beans, which form an important crop.

A pretty mottled green Euryomia was in such swarms upon roses, altheas, etc., that all the flowers were eaten off before they could expand, and each bud would be the centre of a struggling group, which when disturbed buzzed about like a swarm of angry bees. Copris, Geotrupes, and other dung-beetles were numerous on the country trails where the packhorses had marked their passage.

The Lucanidæ, or Stag-beetles furnished two fine species of Lucanus, and also some good specimens in the genus Dorcus, probably of two species. These seem to be generally distributed, epecially in the wooded regions already quoted.

With such a rich and varied vegetation the leaf-feeding Chrysomelidæ were naturally rich in species and numbers. Many of the species were very pretty, and among the most common were some species of flea-beetles, one just like the little striped-wing turnip flea-beetle.

Next to the Scarabæidæ, the most interesting beetles were the Snout-beetles, or weevils (Rhyncophora). The Rhynchitidæ and Attelabidæ were especially well represented by very pretty species. Of Curculionidæ there were also numerous species, but as my specimens have not yet been mounted I do not know what they are. I only obtained one specimen of Balaninus, but found the acorns of some oaks to be greatly infested by larvæ of these nut-weevils.

Among the Japanese names for beetles are *Kogane-mushi* (gold-insects) and *Yoroi-mushi* (mailed insects).

Diptera.—The common house-fly is not in Japan the pest that it is found to be in America, and only in a few places did I notice more than occasional specimens. Other kinds of flies are, however, abundant, and some of them are large and showy, such as a large robber-fly (Asilidæ) with brilliant green eyes and a conspicuous tuft of white pubescence at the tip of the abdomen. Large horse-flies (Tabanus) were annoying along some of the pack-horse trails, and I received quite a severe bite on the arm from one as I was returning from the ascent of Fuji.

The great areas of wet fields offered ample opportunity for the propagation of aquatic insects, and mosquitoes were therefore abundant, except in the higher mountainous districts. The common species is smaller than those of this country, and is nearly black with white markings on the legs. Its bite I did not find very severe, and they are troublesome only from their numbers, and the long period during which they abound. The native name for this insect is *Ka*, and the mosquito net which is used at night in all houses in infested regions is called *Ka-ya*, or mosquito-house.

Fleas were exceedingly abundant in all parts of the country I visited, and in the native houses where we slept on the floors we often had to make a liberal use of insect powder to insure a night's repose. They find good hiding places under the matting which covers the floor, but would not be so troublesome if bedsteads were used. (Jap. *Nomi.*)

Lepidoptera.—In this favorite order I saw many beautiful insects, the most conspicuous being the large black swallow-tailed butterflies, which flitted about the mountain roads and over the grassy plains, and hovered about the flowering shrubs such as the abundant Hydrangea. Of yellow papilios, however, I saw few specimens, but these were very similar to our common *P. turnus.* In the woods, which are often almost impenetrable from bamboo scrub, creepers, etc., were many fine Satyrids, Graptas, etc., and a pretty Limenitis having a pale blue band across the wing. The small blue butterflies were sometimes in immense numbers, as along the road leading across the plain from the foot of Fuji to Nakabata, where they rose in swarms from every moist spot. With these occurred also great numbers of bright sulphur-yellow butterflies (Colias). Of white butterflies there were fine large species, and I also saw flying in Yokohama examples of what I took to be the common white cabbage butterfly, *P. rapæ.* Skippers did not seem to be in any variety, but on the other hand there were some common butterflies quite unlike those of Canada. High up on one of the mountains, where the flora began to have a home-like appearance, I saw *Vanessa antiopa*, and I also saw on the wing what was apparently *Pyrameis atalanta.* The Japanese name for butterflies is *Chō*, and for the silkworm *Kaiko.*

Of moths I often saw very pretty specimens, but did not attempt to collect any, and cannot even say what groups were most abundant. It will not be out of place here, however, to make a few remarks on what is to Japan a most important species, viz., the silkworm moth, *Bombyx mori.* The rearing of silkworms and the manufacture of their products employ a large part of the population and contribute greatly to the prosperity of the country. The silk is produced chiefly in the central and western parts of the main island of Hondo, and in these regions enormous tracts of land are devoted to raising the various varieties of mulberry whose leaves supply food for the innumerable and voracious worms. In the Shinshiu provinces the extensive plains were almost covered by mulberry bushes, so that we saw little else from the car windows as we passed through them. At the flourishing city of Nagano, the chief town of the province, the shops contained enormous numbers of cocoons, and in almost every house along the neighbouring roads were displayed the same white objects heaped in trays and baskets. In each house also the women were busy reeling the silk from the cocoons with small hand wheels. The main production is by the spring brood, but in some localities there is also a summer one. I did not see any worms feeding at the time of my visit (the middle of Sept.) but saw the moths emerging from the cocoons. At various places in the country I saw large factories for the manufacture of silk (including one at Gifu, since destroyed by the great earthquake of 28th October), but the greater part of the silk is still, I believe, woven upon hand looms.

Hymenoptera.—I collected a fair number of insects belonging to this order, but have not since examined them. The honey-bee does not appear to receive much attention, and the only specimens I saw were at Nikko. All the honey used in Yokohama is obtained from San Francisco. Possibly the flora may not furnish a succession of nectar-bearing flowers sufficient to make the keeping of bees profitable.

Humble-bees appeared at first to be wanting, but later I saw a few species, but not many individuals of any. One very handsome species was velvety-black with the last two segments of abdomen red.

I took one specimen of a carpenter-bee (Xylocopa) very like our *X. virginica*, and two or three examples of a large, stout black Megachile (Lithurgus?), the only leaf-cutting species almost which I observed. Species of Andrena, Halictus, Prosopis, etc., were more or less common.

Wasps were more abundant than bees, and a very large dark Vespa (*mandarina ?*) abounded both in Yokohama and in the country districts. Its nest was constructed of a coarse, heavy mottled paper made from bark, which I frequently saw the wasps obtaining from a maple tree on the lawn. The nest is of large size, and is built in trees, under the eaves of temples, etc. I saw two servants destroying a large one which was suspended in a small tree near the gateway of one of the "foreign" houses in Yokohama. One captured the wasps, which having been disturbed were crawling about on the nests, by means of a slender bamboo, with rice glue on the tip, and the other knocked them off and killed them as captured. When disturbed these wasps buzz around in a very alarming manner, and from their size have a very formidable appearance, but though often threatened I was never stung. A smaller black and white species was also common, but I did not see its nest.

Polistes were very numerous, and built their small exposed combs in the shrubs, especially in the closely-trimmed cedars, which give a good shelter. Fine species of Sphex, Pompilus, Ammophila, etc., were common, as were also Crabronidæ, Scoliadæ, etc. I only saw one Mutilla, which was captured in a very shady corner, near a small shrine embowered in camphor trees, and which gave me a sharp sting before I recognized what I was catching. The only other sting received while in Japan was from a stout black Scolia which I picked up in one of the temple grounds at Nikko, and almost dropped again. Did these insects think that their capture in such sacred precincts was an act of sacrilege deserving of instant punishment, and "Make the punishment fit the crime?"

Parasitic hymenoptera seemed to be less numerous than the stingers, and I obtained but few specimens of ichneumons and braconids, although a few fine species of Pimpla, etc., were seen. It was perhaps too late in the summer for these insects, as there seemed to be very few larvæ feeding to be attacked by them. In the Ueno National Museum in Tokio I saw an interesting braconid with an ovipositor about twice as long as that of our large *Thalessa atrator*, although the insect was smaller. The insect collection in this museum embraced all orders, but was a small one consisting only of a few cases.

Chalcids and Proctotrupids were very rare, although I kept a good look out for them, especially when using my sweeping net. One fine species of Smicra was common, especially about shrubs on the lawn and on some of the rows of broomcorn, which are planted on the margin of fields, and which sometimes attract many hymenoptera and diptera to feed on their exuding juice.

Saw-flies were at first abundant, especially when I was in the Hakone district, but it was late in the season for them, and they rapidly disappeared I noted some interesting larvæ, especially a large one somewhat like the larva of Cimbex, but having a row of fleshy spines along the back. Gooseberry and rose bushes suffer as they do here, and I saw on willow leaves globular galls of Nematus almost like those seen upon our Canadian trees. Some of the galls also contained, as they do here, inquilinous weevils (a small black Apion).

In conclusion, I may say that Spiders were numerous, some of the species being very large and handsome and constructing gigantic webs. Some of the species were also very curious, especially those with thin attenuated bodies, in shape like young walking-sticks, and green or black in colour. Ugly looking Centipedes, three or four inches long, occur under rubbish, etc., even entering the houses, and are said to be venemous.

The observations and collections (not yet mounted or studied) which form the subject of this very hastily prepared, and, therefore, very fragmentary paper, were made between the 12th of August and the 22nd of October.

THE MOOSE FLY—A NEW HÆMATOBIA.

BY WM. A. SNOW, UNIVERSITY OF KANSAS, LAWRENCE.

Entomologists will be interested to learn of the occurrence of a near relative of the Horn Fly, *Hæmatobia serrata*, in the middle of the great cranberry swamps of Northern Minnesota. These vast low areas extend for hundreds of square miles in the vicinity of the Lake of the Woods. They are the favoured home of the American moose, and the hope of obtaining some specimens of this animal for the museum of the University of Kansas, led Professor L. L. Dyche of that institution to traverse these dangerous marshes. Professor Dyche has recently returned after remaining for over three months in the very centre of the swamps, camping upon the occasional sand ridges which cross the region; and to him I am indebted for specimens of a new *Hæmatobia*, which I have named *H. Alcis.*

The flies were noticed first upon skinning the first moose, when a number of them were discovered in the animal's rectum, into which they had crawled for two or three inches in order to deposit their eggs in the excreta. The dejecta upon the ground were also found to contain hundreds of the eggs. Altogether nineteen moose were killed, and in almost every case these flies were observed about them, remaining upon their carcasses as long as they lay unskinned, which was often twenty-four to thirty hours. For some time after the death of the animal, the *Hæmatobiæ* could be seen only with difficulty, concealed as they were by the mosquitos, which were incredibly numerous, lingering in clouds upon the dead moose as long as any of its juices could be extracted. The flies seemed to prefer the regions of the head, rump and legs, where the hair is shortest. It is highly improbable that they find a resting place upon the horns of the moose. The male moose go thrashing about in the underbrush with tremendous energy. They use their horns during a great part of the year to scrape away the bark from trees; and they have a way of winding them in among the bushes when a rival is near, as a challenge. The females, as is well known, have no horns. The present species is very probably indigenous, infesting as it does an animal not in domestication; and inhabiting such secluded inland portions of this continent. The moose obtained by this expedition were all killed far within the swamp, fifteen to twenty miles from firm land; and it is only in such places that this now rapidly disappearing animal can be found. This region is rarely visited by white men, and the few Indians that venture there wait until the surface of the fens is frozen over. It is not altogether unlikely that this fly infests the caribou also. It was hardly possible to observe its actions on the living moose; but we know that it lays its eggs in the excrement, and in all probability it resembles *H. serrata* in other habits as well.

Professor Dyche heard no complaints from owners of stock on the borders of the swamp of the ordinary Horn Fly, or of any similar fly. The cattle are, however, tormented with mosquitos, and smudges are kept constantly burning to which they may run for relief.

OBITUARY—HENRY EDWARDS.

This well-known and highly-esteemed entomologist died at his home in New York City, at 1.30 a.m., on the ninth day of June, 1891. His death was caused by dropsy and other complicated troubles, which affected the heart.

In him the world has lost an earnest devotee to science and art, and those who knew him, a kind-hearted, generous, true and sympathising friend. In his death, entomological science has lost one of its most active and energetic workers, and his loss is deeply felt and deplored by all who knew him, and he has passed out of this earthly domain with the affectionate regret of many grateful and loving friends.

Mr. Edwards was born in Ross, Herefordshire, England, August 27th, 1830, and was destined by his father to become a lawyer. After studying for some time without evincing any particular aptitude for the profession, he entered a London counting house, and frequently appeared in amateur theatricals, for which he had much talent. He finally decided, much against the wishes of his parents, to adopt the professional stage. In 1853 he embarked for Australia, where he made his first appearance as an actor, and where he passed many prosperous years. From Australia he drifted to Peru and Panama, and in 1867 he reached, San Francisco, California. In about 1877 he made his first appearance in the east, at Boston, and finally in 1879 he came to New York. In 1889-90 he again visited his old home in Australia, from where he returned last year. During all these years he was constantly connected with the stage, until only a short time previous to his decease, when he was compelled to retire on account of his illness. At the time of his death he had just returned from a trip to the Catskill Mountains, where he was staying for his health, and three and a half hours later he entered into rest and the everlasting silence.

As an entomologist Mr. Edwards was world-known, and was considered one of the greatest authorities of the science, to which he was attached ever since his boyhood days. He was chiefly known by his excellent papers on the Pacific Coast Lepidoptera, which contain the descriptions of many new and interesting species from that region. He was also known by his articles on North American Ægeriadæ, of which family he described nearly all our American species. Besides these papers he has also written many other articles on descriptions of new species and transformations of Lepidoptera. He also edited three volumes of the journal "Papilio." The last large work he published was his "Bibliographical Catalogue of the Described Transformations of North American Lepidoptera," which is now in the hands of all our working entomologists. Mr. Edwards spent much money for the increase of his collection of insects, and devoted all his leisure time to his favourite study. His travels afforded him many rare opportunities for collecting material for his collection and writings. The collection consists of about 300,000 specimens of insects of all the orders from all parts of the globe. It contains the types of all the species he described, about four hundred and fifty, except a few which are in other collections. It also contains a number of Grote's types of Noctuidæ and Pyralidæ, and many of Fish's types of Pterophoridæ, and types of other writers. It contains also the unique pair of *Oniticellus californicus*, and many other uniques, oddities and rareties of considerable value. The collection is one of the largest private collections in the world. His library consists of about five hundred volumes of entomological works, and about double the number of pamphlets, and about two thousand volumes on travels and other topics. (I am not sure about these figures.)

Mr. Edwards belonged to many scientific and other societies. He was for some time vice-president of the California Academy of Sciences, life-member Brooklyn Entomological Society, member of the Torrey Botanical Club, Players' Club (New York), Bohemian Club (San Francisco), corresponding member Boston Society Natural History, San Francisco Microscopical Society, San Diego Natural History Society, Belgium Natural History Society, etc.

He leaves a widow who deeply mourns his loss, and we would here add our condolence and sympathy and heart-felt regret to her irreparable bereavement.

WM. BEUTENMULLER.

BOOK NOTICES.

INSECTA: By Alpheus Hyatt and J. N. Arms. Boston: D. J. Heath & Co.

This handy volume forms the eighth of the series of the "Guides for Science Teaching," issued by these well known publishers of educational works. The series is intended for the use of teachers who wish to give practical instruction to their classes in Natural History. The volume before us forms a marked advance upon those previously issued inasmuch as it consists of 300 pages, with over 200 illustrations, while none of the others was more than a fourth of these dimensions. This great enlargement is due, no doubt, to the growing popularity of Entomology as a subject for the teaching of observation in schools, as well as for intelligent recreation and serious study on the part of individuals.

The volume before us is an admirable manual for teachers who wish to instruct their pupils in the science of Entomology, and will be found most useful also by private students. It is full of admirable diagrams and illustrations, for the most part original, and it takes up for discussion some of the commonest insects in the different orders that can be readily procured by any one. For instance, the external structure and the internal anatomy of insects are first taught by means of the common locust (*Caloptenus*), which can be taken in quantities anywhere; a May-fly (*Ephemera*), a Dragon-fly, a Cockroach, a May-beetle, the *Archippus* butterfly, etc., are used to illustrate the different orders. No teacher or student need be at a loss for material with which to follow out the instructions in the book. The whole book is excellent, and we have no doubt that it will be found most valuable in the various agricultural colleges especially, as well as in other educational institutions.

We may quote the following advice from the opening chapter:— "Encourage children to watch living locusts.... Better a child should learn to handle one animal, to see and know its structure and how it lives and moves, than to go through the whole animal kingdom with the best text-book, under the best teacher, aided by the best charts ever made. The former would have learned what real knowledge is and how to get it, while the latter would have simply learned how to pass at his school examinations."

C.J.S.B.

AMONG THE MOTHS AND BUTTERFLIES: By Julia P. Ballard. G. P. Putnam's Sons, New York; pp. 237, 1890.

This beautiful book is an enlarged and revised edition of "Insect Lives," published in 1880, and contains recent studies and many additional illustrations. It treats especially of rearing butterflies, sphinges and moths from the caterpillars, and is based wholly on the personal observations of the author. Without previous knowledge of entomology, Mrs. Ballard found herself attracted by some species of caterpillar, and followed it up to pupa and imago, making original discoveries at every step, and gaining experience day by day, she has become an expert in that line. Many of the species treated of, if their earlier history is mentioned at all in books, have never been so carefully studied as here; witness the story of the Great Leopard Moth, the Bulrush Caterpillar, the Monkey-faced Moth, the Beechnut Box, the Rosy Dryocampa. Of many others, better known than these, there are interesting notes, as *Orgyia leucostigma*, *Deilephila lineata*, *Cerotocampa regalis*. The enthusiasm of the authoress is contagious, and makes the reader wish that spring would hurry along. I do not know of any book—certainly there is none in America—which has attempted to enter the field now taken possession of by Mrs. Ballard. If any good pater, or aunt, or cousin, wishes to do a good turn to an active boy or girl, they could not do better than put this book in the young person's hand—at the same time a net and collecting apparatus (which our good friend John Akhurst will be happy to furnish), and bid them, when spring comes, search the fields and woods as Mrs. Ballard has done. The difference between eyes and no eyes is wonderful, and occupying the former will keep young people out of mischief, at least giving them something to do and to think of. Once let a boy put his foot over the threshold of this temple of ours and catch a glimpse of the inner mystery, and there will be no idle and wasted hours. And to this end the authoress of "Moths and Butterflies" has well served her generation.

W. H. EDWARDS.

MANUAL OF ANIMALS INJURIOUS AND BENEFICIAL TO AGRICULTURE: By Dr. J. Ritzema Bos, Lecturer at the Agricultural College of Wageningen, Holland. Berlin, 1891.

This magnificent volume in German makes one wish that English-speaking farmers and gardeners, as well as Entomologists, possessed in their own language, and for their respective countries, a similar compendium of knowledge on the "Animals injurious and beneficial to agriculture, Cattle-breeding, Forestry and Horticulture."

This work of 876 pages contains all the information necessary concerning the forms, occurrences, life history in relation with man of his various animal friends and foes, and the curative and preventive measures against their attacks. The newest discoveries of workers in this field, and original researches by the author are recorded, and 477 figures, engraved with scientific accuracy, show the appearance of the different mammals, birds, insects, snails, and worms, the details of their structure, and many devices for resisting the injurious kinds or assisting those that war against the latter and are thus precious allies of the farmer and gardener.

The first 30 pages are devoted to considerations on the causes of occurrence of obnoxious animals, and on the general means of protection against them. Then 80 pages treat of mammals from the bear to the mouse and the bat, 120 of birds, 460 of insects, 130 of snails and worms. The depredations of insects, which have been particularly studied by Dr. Bos, are especially dwelt upon.

At the end of the book are tables of the animal pests arranged according to the place where they live. This table is most useful, for, with its aid, anyone who has found any form of animal life preying on man, cattle, domestic animal, tree, or plant, or in granary, barn, or house, and wishes to know its name, habits, the nature of its ravages, the remedies against it, etc., can with very little trouble find the page in the volume where the desired information is given.

For instance, the first item of this table is as follows, with reference for each animal to the page in the book :—

Bee, bee hive :—Foxes, marten, polecat, bear, honey-buzzard, tits, occasionally other bird species ;—spiders ;—wasps ;—the brown bee louse (*Braula cæca*, a winged louse) ;—the so-called black bee louse (larva of an oil beetle), which, however, leads usually its cuckoo life only in wild bees' nests ;—bee moths, wax moths ; bee-beetles ;—earwigs.

Similar lists follow for cat, cattle, dog, domestic birds and eggs, goat, horse, man, pig, rabbit, sheep.

The references to apple tree pests are arranged under the different heads : In roots, in wood, under bark, in bark crevices, on and in buds, on young shoots, on one year's twigs, on buds and leaves, in the fruit, ravagers of the fruit ; and similarly for all common trees and plants of field, garden, or forest. J. A. Guignard, Ottawa.

Annual Report of the Experimental Farms : Ottawa : p.p. 314 ; 1891.

The Director of the Experimental Farms of the Dominion of Canada has recently issued his report for last year, and a very interesting "blue book" it is. The record of experiments with two-rowed barley is particularly valuable and important at the present time, and concerns everyone who is interested in the welfare and prosperity of this province. The reports of the Agriculturist, who treats especially of dairying, of the Horticulturist, Chemist and Poultry Manager, are all useful and instructive ; but the one which especially interests us is, of course, that of the Entomologist and Botanist, Mr. James Fletcher. His share of the report occupies over fifty pages, and is illustrated by some wood cuts of noxious insects, and nine beautiful full-page plates of various useful grasses. The insects treated are the American Frit Fly (*Oscinis variabilis*), the Cabbage Maggot (*Anthomyia brassicæ*), the Diamond-back Moth (*Plutella cruciferarum*), whose larvæ attack the leaves of cabbages. the Mediterranean Flour Moth (*Ephestia Kuhniella*), the Pea Weevil (*Bruchus pisi*), the Strawberry Weevil (*Anthonomus musculus*), and the Vancouver Island Oak Looper (*Ellopia somniaria*). In each instance Mr. Fletcher fully and carefully describes the mode of attack, and then gives the most satisfactory remedies, It is hardly necessary to tell our readers, who are familiar with Mr. Fletcher's work, that these articles are as complete and accurate as is possible in a limited space. It is very cheering to find that the mill that was so badly infested with the *Ephestia* moth year before last (of which the writer was an eye-witness), has been completely cleared of the pest by scrupulously carrying out, though with no little labor and expense, the directions of the entomologist. In spite of this example, it is surprising to find that the proprietors of other mills and feed stores in the same city are too apathetic and careless to take any measures to exterminate this insect when it appears on their premises. They will soon find that such neglect means utter ruin to their business, unless they take warning in time. The remainder of Mr. Fletcher's report is almost entirely devoted to the subject of grasses, of which he has been cultivating for the sake of experiment over a hundred different kinds. C. J. S. B.

THE BUTTERFLIES OF NORTH AMERICA: by W. H. Edwards. Third series; Part XI.

It is hardly necessary to do more than chronicle the issue of a new part of this magnificent work. The beauty and accuracy of the plates, and the excellence and value of the descriptive letter-press are too well known to need any further commendation. The part now before us illustrates and describes the complete life history, in all its stages, of *Apatura flora*, Edw. *Satyrus Meadii*, Edw., *Chionobas chryxus*, Doubleday, with its variety, *Calais*, Scudder. The last mentioned species is of peculiar interest to us, as it is found throughout the Rocky Mountains from Colorado to Canada. A most graphic account of its habits is given by Mr. Bruce, who has observed the insect for several years past. Why is it that *every* North American lepidopterist does not possess himself of a copy of this noble work? It can hardly be the cost, for the numbers appear at such long intervals that a very little self-denial even on the part of the impecunious would suffice for their purchase. While the subscriber would get a joy and treasure for life, let him think what a gratification and help it would be to Mr. Edwards to have his subscription list trebled, as it should be.

C. J. S. B.

BIBLIOGRAPHICAL CATALOGUE OF THE DESCRIBED TRANSFORMATIONS OF NORTH AMERICAN LEPIDOPTERA; being Bulletin No. 35 of the United States National Museum, by Henry Edwards, 1889.

This work, issued by the Smithsonian Institution, is one of very great value to the working lepidopterists of North America, and truly supplies a long-felt want. Mr. Edwards, who has devoted so much time to the compilation of this work, is entitled to the warmest gratitude of his brother entomologists for his public-spirited labours in this connection. The work extends to 147 pages octavo, and comprises a table of the number of species in each family, of which descriptions of earlier stages are recorded in this catalogue, a list of the principal authors and publications quoted, the body of the catalogue extending from page 9 to page 137 inclusive; an appendix giving references to a few species which are not distinguishable by modern authors, and a list of some of the most valuable papers which have been published on this continent on the subject of preparatory stages, food plants, rearing and describing larvæ, etc., etc. Then follows an index to genera, and the work ends with a most useful food habit index. The general plan of the work is to give the names of all species of which any of the preparatory stages have been described, followed by the references to these descriptions in the order in which they are published, the dates of publication being given. Upon turning to any species one can thus see at a glance just what of its earlier stages have been described, and by looking up the references can tell whether or not they could be supplemented with advantage, while the absence of any species from the list is a very sure indication that its preparatory stages are wholly undescribed. One can thus see just what has already been done and what remains for investigation, and this is most important, for it is uudoubtedly the case that many observations of interest and value are made every year without being published, chiefly, perhaps, because those who make them are unaware that they have not previously been given to the world. The amount of literature examined in the preparation of this work was very great, and the care necessary to avoid errors and omissions proportionate. The table on page seven shows that some part of the earlier stages of 1069 butterflies and moths have been described, but many of these descriptions are very incomplete, and we can thus see how much still remains to be done in working out these life histories. Of course in a work of this kind, where the field was so large, it was inevitable that some mistakes and omissions should occur, but it is most creditable to Mr. Edwards that they should be so few and so unimportant. It was unfortunate that the printing had to be done during the absence of Mr. Edwards in Australia, as otherwise most of the typographical errors would unquestionably have been detected and corrected. It is, however, a mistake to refer to author's separates, instead of to the work in which the description originally appeared, as for example in regard to the larva of *Chionobas Macounii*—the reference given is "J. Fletcher, a trip to Nepigon, p. 12," whereas it ought to be, "J

Fletcher, Rep. Ent. Soc., Ont., 1888, p. 85." It is greatly to be hoped that Mr. Edwards will be able to fulfil his promise to issue yearly supplements, in order that the work may be kept up to date and its usefulness be thus maintained. The price of this work was fifty cents, but the first edition has already been exhausted. It is greatly to be hoped that a new edition will soon be issued, as no working lepidopterist can get on without it.

H. H. LYMAN.

INSECTS AND INSECTICIDES, by Clarence M. Weed. Hanover, N.H., 1891.

Under the above caption Dr. Weed has published a small volume of 281 pages, well printed and copiously illustrated, which will be found most useful by those for whom it is prepared, the farmer, the fruit-grower, the floriculturist and the housekeeper. The work consists of an introduction and six parts. The introduction gives a concise account of the transformations of insects, which are illustrated by the life history of *Papilio Asterias*, the Celery Caterpillar, for those which have a complete metamorphosis, and the Chinch Bug for those who pass through incomplete transformations. The differences between biting and sucking insects are explained, and the natural enemies of injurious insects are treated of. There is then a summary of the different insecticides and the best methods of applying them. The introduction closes with short instructions for collecting and preserving insects.

PART I. treats of Insects affecting the Larger Fruits—apple, plum, pear, cherry, peach.

PART II.—Insects affecting Small Fruits.—Strawberry, currants and gooseberries, raspberry and blackberry, grape.

PART III.—Insects affecting shade trees, the rose, and house-flowers. Parts I. and III. of Dr. Weed's work have appeared previously in a small edition issued by the Columbus (Ohio) Horticultural Society.

PART IV.—Insects affecting Vegetables.—Tomato, potato, celery, squash, cucumber, bean, pea, cabbage, onion, asparagus and rhubarb.

PART V.—Insects affecting Cereals and Forage Crops—Indian corn, wheat, clover, grass.

PART VI.—Insect Pests of Domestic Animals and the Household.

On the whole this is a very useful and attractive volume, well arranged, easy of reference and well illustrated. The accuracy and quality of Dr. Weed's scientific work are now too well-known to need any comment further than to say that this, his last publication, is up to his usual excellent standard. J. F.

SEVENTEENTH ANNUAL REPORT

OF THE

ONTARIO AGRICULTURAL COLLEGE

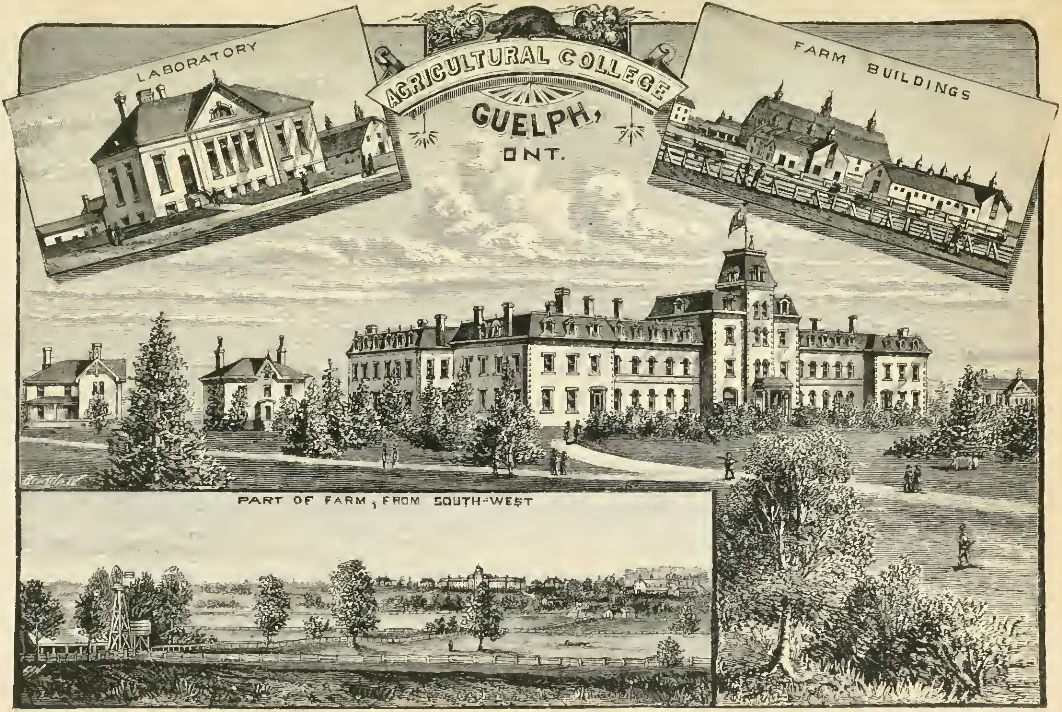
AND

EXPERIMENTAL FARM,

1891.

PRINTED BY ORDER OF THE LEGISLATIVE ASSEMBLY.

TORONTO:
PRINTED BY WARWICK & SONS, 68 AND 70 FRONT STREET WEST.
1892.


LABORATORY
AGRICULTURAL COLLEGE
GUELPH,
ONT.
FARM BUILDINGS
PART OF FARM, FROM SOUTH-WEST

CONTENTS.

PAGE.

FRONTISPIECE — Views of College and Farm.

LETTER OF TRANSMITTAL : 1

OFFICERS AND ADVISORY BOARD : 2

PART I.

REPORT OF THE PRESIDENT : 3

The College, 3—Convocation Hall, 3—Horticultural Department, 3—Experimental Dairy, 4—Travelling Dairy, 4—Farm proper, 5—Live Stock, 5—Experimental work, 5—Students in attendance, 6—Smoking in the College, 7—Analysis of College roll, 7—Religious denominations, 7—Age of students, 8—County students, 8—Classroom work, 8—Examiners, 8—Bachelors of the Science of Agriculture, 8—Recipients of Associate diplomas, 9—First-class men, 9—Medalists, 10—Prizemen, 10—Closing exercises 10,—Changes in staff, 11—Farmers' Institutes, 11—Financial statement 15.

PART II.

REPORT OF THE PROFESSOR OF NATURAL HISTORY AND GEOLOGY : 19

College Museum, 19—Library, 20—Reading room, 20—Oyster-shell bark-louse and the pear-tree slug, 22—Ginseng (*Arabia quinquefolia*), 23—Meteorology, 26—Tables, 27 and 28.

PART III.

REPORT OF THE PROFESSOR OF CHEMISTRY : 29

Increased room required, 29—Sugar beets, 30—Table containing detailed report of thirty-two samples, 32-33.

REPORT BY C. C. JAMES, M. A., FORMERLY PROFESSOR OF CHEMISTRY : 34

Determination of fat in milk, 34—Effects of pitting on Sugar beets for sugar manufacture and for feeding, 37—Cultivation, 39.

PART IV.

REPORT OF THE PROFESSOR OF VETERINARY SCIENCE : 41

Death of a steer, 41—A weak foal, 42—A case of tuberculosis, 42—Sheep, 42.

PART V.

REPORT OF THE FOREMAN OF THE HORTICULTURAL DEPARTMENT : 43

The new greenhouse, 43—Table showing garden produce supplied College during the year, 44.

PART VI.

REPORT OF THE PHYSICIAN : 45

PART VII.

REPORT OF THE PROFESSOR OF AGRICULTURE AND FARM SUPERINTENDENT : 47

Improvements made during the year, 48—The improvement of roads, 48—The erection of fences, 48—Fitting up of the experimental sheep barn, 48—Sinking of wells, 49—Destruction of weeds, 49—Special crops grown, 52—Sugar beets, 52—Rye and rape, 53—Catch crops, 55—Live stock, 55—Horses, 55—Cattle, 55—Sheep, 55 Swine, 56—Miscellaneous items, 56—The exhibits made, 56—The sale of live stock, 56—The sale of new grains and potatoes, 57—Visitors to the Station, 57

PAGE.

Experimental Department : 57

Field experiments, 58—Live stock experiments, 58—Co-operative experiments, 58—Rainfall and temperature, 59—List of experiments, 59—Field plot experiments, 61—Cereals, on small plots, 61—Barley, comparative test of varieties, 61—Barley, different dates of seeding, 65—Peas, comparative tests of varieties, 66—Spring wheat, comparative test of varieties, 66—Spring wheat, different dates of seeding, 69—Ontario varieties of winter wheat, 70—Winter wheat, comparative test of foreign varieties, 76—Oats, comparative tests of varieties, 78—Oats, different dates of seeding, 82—Barley, spring wheat and oats, sown separately and in mixtures, 83—Cereals on large plots, 83—Barley, 83—Peas, 84—Spring wheat, 85—Oats, 85—Potatoes and roots, 86—Potatoes, comparative test of varieties, 86—Potatoes, different depths of planting tubers, 87—Swede turnips, comparative test of varieties, 88—Swede turnips, thinning plants to different distances in the drill, 89—Fall turnips, comparative test of varieties, 90—Mangels, comparative test of varieties, 91—Carrots, comparative test of fifteen varieties, 92—Sugar beets, comparative test of varieties, 92—Comparative yield of roots upon flat and ridged land, 92—Swede turnips, mangels and sugar beets grown at different distances between the drills, 93—Large plots with sugar beets, Swede turnips, mangels and carrots, 93—Silo and forage crops, 94—Fodder corn, comparative test of varieties on sod and on stubble land, 94—Influence of salt with fodder corn on four kinds of soil, 98—Fodder corn, hills *versus* drills, 99—Rape, application of fertilisers, 100—Rape, thinning plants to different distances in the drills, 101—The growth and uses of rape, 101—Illustration : Lambs feeding upon rape 103—Experiments in growing millet, millo maize, and Kaffir corn, 105—Clover, comparative tests of varieties, 106—Experiment in growing white or table mustard, 106—Grain exhibit, 106—Live stock experiments, 106—Corn ensilage for making beef, 106—Feeding shorn and unshorn lambs in winter, 110—Fattening lambs for the British market, 113—Ensilage and roots as food factors in swine feeding, 118—Feeding swine with grain and meal, 122—Feeding grade steers of different breeds, 125—A feeding test between the improved Yorkshire and Berkshire breeds of swine, 131—An experiment to determine the amount of manure made by a cattle beast during the successful period of its growth, 131—An experiment to determine the effects of constant confinement upon breeding properties of a cattle beast, 131—The feeding of lambs upon rape alone, rape and meal, and rape and pasture, 131—The feeding of lambs upon rape alone, when all the conditions are favorable, 132—Feeding lambs upon rape grown after winter wheat, 133—The exhibit of live stock, 133.

Report of the Farm Foreman : 134

Cropping, 134—Live stock, 139.

Report of the Mechanical Foreman : 140

PART VIII.

Report of the Professor of Dairying : 143

Farmers' Institutes, 143—Travelling Dairy, 144—Illustrations : Butter moulds, 147—Illustration : Shipping box, 148—Dairy work at the College, 152—Illustration : Hand cream separator, 153—The effect of food on the quality and quantity of milk, 154—Effect of food on quantity of milk, 160—Source of butter fat in milk, 163—Record of our dairy herd, 173—Differences in creaming, due to peculiarities in the individual cows of our herd, 175—Experiments with Boyd's Vat and Starter, 178—Illustration, 178—Sweet cream butter, 179—The setting of milk delayed, 181—Babcock and Beimling tests, 183—Composite samples, 184—Per cent. of fat in whole milk, skim milk and butter-milk, 185—Variations in fat of samples of milk taken at different periods during milking, 185—An incident in buying a cow, 186—Amount of land required to soil cows, 186.

AGRICULTURAL AND EXPERIMENTAL UNION.

Twelfth Annual Meeting :

President's address, T. G. Raynor, B.S.A. 187
The future of the live stock industry of Ontario, Thos. Shaw 188
Election of officers 192

PAGE.
REPORTS OF EXPERIMENTS IN AGRICULTURE: 193

Grain on plots fertilised in 1887, 193—Superphosphate, dried blood and scrap, farmyard manure, and no manure with oats, 193—Application of sodium nitrate to wheat, 195—Testing new and promising varieties of grain, 196—Different modes of corn cultivation, 196—The growing of lucerne, 197.

The Farmer's Fruit Garden, H. L. HUTT 200
How to Make Farming Pay, SIMPSON RENNIE 202
Dominion Experimental Farms, PROF. WM. SAUNDERS 203
Winter Dairying for Ontario, G. HARCOURT, B.S.A. 203
Our Horses and Horse Markets, F. C. GRENSIDE, V. S. 207

THIRTEENTH ANNUAL MEETING:

President's Address, ELMER LICK 209
Question Drawer 210
Dairying from a Financial Point of View, S. P. BROWN 213
Agricultural Experiment 214
Foul Brood Germ (*Bacillus Alvei*), R. F. HOLTERMANN 215
Profits of Winter Dairying, JOSEPH YUILL 215
Feeding Steers for the British Market, J. McMILLAN, M. P. 218
Farming as an Occupation, President JAMES MILLS, M.A. 220
Stock Feeding, H. B. JEFFS 222
Report of Experiments in Horticulture, ELMER LICK 223
Annual Supper 226
Election of Officers 227
Reports of Committees 227
Treasurer's Report 227
Hog Raising, J. A. B. SLEIGHTHOLM, B.S.A. 228
Poultry in its Relation to Agriculture, A. G. GILBERT 231

REPORT OF EXPERIMENTS IN AGRICULTURE: 236

Superphosphate, dried blood and scrap, farmyard manure and no manure with oats, 238—Application of sodium nitrate to spring wheat, 239—Corn cultivation, drills *versus* hills, 239—The growing of lucerne, 240—Testing six promising varieties of corn, 241—Comparative tests of five leading varieties of turnips, 242—Comparative tests of five leading varieties of mangels, 243—Comparative tests of five leading varieties of carrots, 244—Comparative tests of six promising varieties of spring wheat, 244—Comparative tests on six promising varieties of barley, 245—Comparative tests of six promising varieties of oats, 246—Winter wheat test, 247.

The Future of Sheep Husbandry in Canada, Hon. JOHN DRYDEN 248
Notes on the Origin and Improvement of Cultivated Plants, Prof. C. F. WHEELER 251
Resolutions 256

APPENDICES.

Appendix I.—Graduates and Associates 257
Appendix II.—College Roll for 1891 259
Appendix III.—Syllabus of Lectures 261
Appendix IV.—Examination Papers 267
Appendix V.—Class Lists 283

TIME TABLE FOR FALL TERM.

The following time table indicates the class-room work at the Ontario Agricultural College from the 1st October to the 22nd December :

FIRST YEAR.

Hour.	Monday.	Tuesday.	Wednesday.	Thursday.	Friday.
A.M. 8.45	Agriculture.	Arithmetic.	Agriculture.	Arithmetic.	Agriculture.
9.45	English Literature.	Physiology and Hygiene (6 weeks). Zoology (5 weeks).	Grammar and Composition.	Chemistry.	Grammar and Composition.
10.45	Veterinary Anatomy.	Veterinary Anatomy.	English Literature.	Physiology and Hygiene (6 weeks). Zoology (5 weeks).	Book-keeping.

SECOND YEAR.

8.45	Literature.	Agriculture.	Mechanics.	Agriculture.	Mechanics.
9.45	Agriculture.	Literature.	Drawing.	Horticulture (8 weeks). Entomology (3 weeks).	Agricultural Chemistry.
10.45	Agricultural Chemistry.	Horticulture (8 weeks). Entomology (3 weeks).	Agricultural Chemistry.	Veterinary Pathology.	Veterinary Pathology.

THIRD YEAR.

8.45	Geology.	Bacon's Essays.	Latin.	Addison's Spectator.	Pope's Essay on Criticism.
9.45	Chemistry.	Themes and Bain's Rhetoric.	Agriculture.	Drawing.	Tennyson's Locksley Hall and In Memoriam.
10.45	Natural History.	Chemistry	Natural History.	Dairying.	Agriculture.

SEVENTEENTH ANNUAL REPORT

OF THE

ONTARIO AGRICULTURAL COLLEGE

AND EXPERIMENTAL FARM.

GUELPH, January 2nd, 1892.

To the Honorable JOHN DRYDEN,
Minister of Agriculture :

DEAR SIR,—I have the honor to submit herewith the Seventeenth Annual Report of the Ontario Agricultural College and Experimental Farm.

In this Report we have reviewed briefly the work of the year 1891 under the following heads :—

PART I.—REPORT OF THE PRESIDENT.
PART II.—REPORT OF THE PROFESSOR OF GEOLOGY AND NATURAL HISTORY.
PART III.—REPORT OF THE PROFESSOR OF CHEMISTRY.
PART IV.—REPORT OF THE PROFESSOR OF VETERINARY SCIENCE.
PART V.—REPORT OF THE FOREMAN OF THE HORTICULTURAL DEPARTMENT.
PART VI.—REPORT OF THE PHYSICIAN.
PART VII.—REPORT OF THE PROFESSOR OF AGRICULTURE AND FARM SUPERINTENDENT.
PART VIII.—REPORT OF THE PROFESSOR OF DAIRYING.

I have the honor to be, sir,
Your obedient Servant,

JAMES MILLS,
President.

MINISTER OF AGRICULTURE

HON. JOHN DRYDEN, TORONTO.

Ontario Agricultural College and Experimental Farm, Guelph, under control of the Minister of Agriculture.

OFFICERS.

JAMES MILLS, M.A	President.
THOMAS SHAW	Professor of Agriculture and Farm Superintendent.
A. E. SHUTTLEWORTH, B.A. Sc.	Professor of Chemistry.
J. HOYES PANTON, M.A., F.G.S.	Professor of Natural History and Geology.
F. C. GRENSIDE, V.S.	Professor of Veterinary Science.
H. H. DEAN, B.S.A.	Professor of Dairy Husbandry.
E. L. HUNT, B.A.	Assistant Resident and Mathematical Master.
CAPTAIN WALTER CLARKE	Instructor in Drill and Gymnastics.
C. A. ZAVITZ, B.S.A.	Assistant Superintendent of Experiments.
H. B. SHARMAN, B.S.A.	Assistant Chemist.
A. McCALLUM	Bursar

ADVISORY BOARD.

C. C. JAMES, M.A.	Deputy Minister of Agriculture, Toronto.
JOHN I. HOBSON	Mosborough, County of Wellington.
JOHN McMILLAN, M.P.	Constance, County of Huron.
EDWARD JEFFS	Bond Head, County of Simcoe.
J. S. SMITH	Ailsa Craig, County of Middlesex.
G. B. BOYCE	Norham, County of Northumberland.
D. A. DOWLING	Appleton, County of Carleton.
WM. DONALDSON	Woodstock, County of Oxford.

Chairman of Board	JOHN I. HOBSON.
Secretary of Board	C. C. JAMES, M.A.

PART I.

REPORT OF THE PRESIDENT.

I have pleasure in referring very briefly to our work during the past year. It has been in some respects more satisfactory than usual. Owing to the enterprise and liberality of the Minister of Agriculture, we have been able to take several distinct steps in advance. We have added largely to our equipment in the College, the Dairy, and the Horticultural Department; we have employed the help necessary to clean the farm; and have largely extended the work and usefulness of the Experimental Department.

The College.

We have had the usual routine of work in the College. Everything has gone on quietly and harmoniously. The main College buildings have been re-floored throughout with maple; the old plaster ceilings in the kitchen, laundry and reading-room have been removed and wooden ones put in their place; two flights of stairs in the front building and one in the servants' apartments have been renewed; and new iron beds have been purchased to take the place of the very dingy and somewhat dilapidated wooden bedsteads which have presented a rather discreditable appearance for the last five or six years.

The purchase of the Notman collection of minerals has made so varied and valuable an addition to our specimens that we now have one of the largest, most interesting, and instructive collections of fossils, minerals and rock specimens to be found anywhere outside of the large university cabinets and museums. This addition to our equipment for work in the College has made it possible for our professor of geology to give a broad and thoroughly practical course of instruction in geology, mineralogy, and the formation of the soil.

Convocation Hall.

Our new Convocation Hall is not yet finished. It is well on towards completion, or rather, we should say, towards the limit beyond which the contractor cannot go, until an additional sum of money is voted. The amount asked under this head was found to be insufficient. Hence we shall have to wait till funds are provided for the heating, lighting, and completion of the building. When this building is finished and equipped for use, both as a hall and a gymnasium, we shall have something for which we long pleaded in vain, something which the students will appreciate, and for which the thousands of farmers who visit us every summer will be sincerely thankful.

Horticultural Department.

The work in this department is heavy and demands very close attention. It embraces the care of a twenty-three acre lawn, which has to be gone over almost every week from the 1st of June to the 1st of October; a large collection of ornamental shrubs and trees, which have to be dug around and otherwise cared for during the summer season; a four-acre kitchen garden, which has to be well worked in order to grow the vegetables required by the College ; a small nursery, a fair-sized orchard, a great variety of flower-beds, and several forest-tree clumps (pine, larch, walnut, etc)—all needing constant attention and much labor to keep them in anything like presentable shape for public inspection.

With these different branches of horticultural work, our foreman, Mr. James Forsyth, and his assistants have been fully occupied during the past season, but till the present time we have not been in a position to do properly the work which we have felt we should do in this department. Now, however, we have a large botanical laboratory and a complete set of new greenhouses in course of construction, and when these buildings are finished we shall have everything necessary for practical instruction in botany and horticulture at all seasons of the year—wet or dry, hot or cold. In this laboratory there is a large class room, so arranged that plants from the adjoining greenhouses can, with very little trouble, be brought in to illustrate lectures every day in the year, if need be ; in it there is also a private room for practical work by the professor of botany, an office and work room for the professor of horticulture, and a well-lighted room for microscopic work by the students. Taking this equipment in connection with our orchard, nursery, arboretum, and forest-tree clumps, I think we shall henceforth have all the appliances necessary for first-class work in botany and horticulture.

Experimental Dairy.

With the consent and approval of the Minister of Agriculture, we have recently made important alterations and improvements in our dairy building. For several years past the greater part of this building has been used as a creamery, which has been run on the cream gathering plan, in order to ascertain whether butter-making could be successfully carried on in a stock-raising district. The experiment has been quite satisfactory. It has shown that even in a neighborhood which gives its attention very largely to the breeding and feeding of beef cattle—that even in such a neighborhood a creamery can be operated so as to give the butter-maker fair wages for his services and pay the farmer a little more for his butter than he can get in the local markets, while it relieves his wife and family of some care and a large amount of labor. So far, this work has served a good purpose ; but nothing more is necessary to convince the people of Ontario that a creamery can be successfully operated in any locality in which the farmers within a radius of four or five miles can be induced to furnish milk or cream enough to make from 400 to 600 lb. of butter per day throughout the grazing season. This is now admitted on all hands ; and it also seems to be a matter beyond doubt that, if good ensilage were provided, better results could be obtained from butter-making in winter than in any other season of the year.

It being thus unnecessary for us to run a creamery any longer, we decided about two months ago to make several changes in our dairy building and put an addition to it, in order to fit it for the purposes of instruction and for experimental work on a larger scale than we have hitherto attempted. When these additions and alterations are completed, we shall have a cheese room, a butter room, a cheese-curing room, a milk-testing room, a milk cellar, an office, and two class rooms with elevated seats, one looking into the butter room and the other into the cheese room—all heated by steam and sufficiently large for practical purposes. With this equipment and a proper outfit of the latest dairy machines and utensils (separators, extractor, etc.), we hope to do good work in this important department.

Travelling Dairy.

By order of the Hon. John Dryden, a travelling dairy was organised and sent out in June last, to give theoretical instruction and practical object lessons in milk-testing and butter-making By this means Mr. Dryden hoped to assist the farmers of Ontario in their efforts to make first-class butter for their own use and for the local markets. He did not, however, wish to do anything which would have even the appearance of competition with our creameries or cheese factories in the valuable work which they are doing. Hence, in making the programme for our first series of meetings, we selected counties which have not hitherto gone extensively into any branch of dairying. The deputation sent out consisted of H. H. Dean, B.S.A., our professor of dairying, S. P. Brown, butter maker, and W. J. Palmer, B.S.A., a young man who has given special attention to the theory and practice of butter-making for some time past. These gentlemen, all graduates of our own College, held their first meeting at Islington, four miles west of Toronto Junction, on the 29th or 30th of June, and from that point proceeded through the counties of York, Simcoe and Ontario, holding meetings almost every day till near the end of August. During the greater part of September they were employed at exhibitions, and on the 2nd or 3rd October they set out on a trip through the county of Essex. The time spent in these trips was nearly three months; the attendance at the meetings was large, considering the time of the year; the interest taken in the lectures, in the butter making, and the milk-testing was intense; and the work done was everywhere spoken of as being very useful—just the thing for the farmers, their wives, their sons and their daughters. In fact, the success of the undertaking has far exceeded our most sanguine expectations, and so great has been the demand for meetings in all sections of the Province that the Mr. Dryden has decided to send out two deputations next spring, to commence work early in the month of May.

FARM PROPER.

Our farm, like most other parts of Ontario, produced good crops last year. The wheat was excellent, both in quality and quantity; the oats and barley, good; the turnips and mangels, first-class; and the corn, a very fair crop. Our hay crop was, perhaps not quite up to the average; and our potatoes were damaged a good deal by the rot.

For the last two years, Prof. Shaw and his foreman, Mr. J. E. Story, have put forth special efforts to clean the farm of all foul weeds. This object they have sought to attain in three ways: (1) by thorough cultivation, (2) persistent spudding, and (3) the growing of rape after fall rye. Already a good deal has been accomplished; and in another year or two I think our farm will be in such shape that we shall not need to apologise for any part of it.

The general appearance of the place has, we think, been improved a good deal within the past year, by the construction of a strong and handsome wire fence on both sides of the road in front of the College, and along a portion of the lane running past the farm buildings; but a more important thing is our late importation of

LIVE STOCK.

The Hon. Mr. Dryden himself crossed the Atlantic last June, in order to purchase such animals as we needed to make our herds and flocks adequate to our requirements for instruction and experimental work. In a very short time, Mr. Dryden selected and sent to this country a few Tamworth pigs and quite a number of sheep and cattle. The cattle are still in quarantine; but we have had the sheep for nearly three months; and the best judges in the Province say that, in all the breeds represented, Mr. Dryden made an excellent selection. The Shropshires, Hampshires, Suffolks, Southdowns, and Horned Dorsets are all that could be desired. The Leicesters, which were selected by deputy, are not quite so much admired as the others.

With a good stockman and such a valuable addition to our sheep and cattle, I have no doubt that Prof. Shaw will be able to show good results in this important department of our work.

EXPERIMENTAL WORK.

By increased help and a more liberal expenditure in this department, the work has been largely extended within the last couple of years. During the year 1891, our experimentalist, Mr. C. A. Zavitz, under the supervision of Prof. Shaw, has undoubtedly made a large number of very useful experiments at the College, and, as an officer of the Ontario Agricultural and Experimental Union, has directed a somewhat elaborate system of experimental work throughout the Province.

On the plots at the College, Mr. Zavitz has tested 65 varieties of barley, 116 of oats, 44 of peas, 57 of spring wheat, 51 of fall wheat, 84 of Indian corn, 76 of potatoes, 56 of turnips, 35 of mangels, 4 of sugar beets, 15 of carrots, 9 of clover, and 7 of millet. He has also tried different dates of seeding on 36 plots, mixtures of grain on 16 plots, various ways of planting and cultivating Indian corn on 16 plots, and a number of experiments with rape, roots, and grasses on 153 plots.

To this list may be added some important live stock experiments conducted by Mr. A. Cuppage under the joint supervision of Prof. Shaw and Mr. Zavitz, as follows:

With cattle	4 experiments	20 animals.
" sheep	4 "	171 "
" pigs	3 "	24 "

In addition to the experiments at the College, the following valuable work has been done very largely under the control and supervision of our experimental department:—

Co-operative experiments conducted by members of the Ontario Agricultural and Experimental Union and other interested farmers throughout Ontario:—

No. of Experiment.	Names of Experiments.	Number of plots required for each.		Plots used for these Tests during 1891.	
				O. A. C.	By farmers over Ontario.
1..	Testing superphosphate, dried blood, and scraps, farm yard manure, and no manure with Oats	4	Fertilisers..	6	70
2.	Comparing the advantage of nitrate of soda over no fertiliser with Spring Wheat	2			
3 .	Ascertaining the relative value of planting Corn in hills as against drills	2	Foddercrops	9	196
4..	Growing Lucerne as a crop for fodder	1			
5..	Testing six promising varieties of Corn	6			
6..	Testing five promising varieties of Turnips	5	Root crops..	15	350
7..	Testing five promising varieties of Mangels	5			
8..	Testing five promising varieties of Carrots	5			
9 .	Testing six promising varieties of Spring Wheat	6	Spring grain crops.	27	1026
10..	Testing six promising varieties of Barley	6			
11..	Testing six promising varieties of Oats	6			
12..	Testing six promising varieties of Winter Wheat	5	Wintergrain	37	1000
				94	2642

STUDENTS IN ATTENDANCE.

The total number in attendance in 1891 was 132, seventy-seven per cent. of whom were from the Province of Ontario. Thirty-six counties of Ontario were represented, and the largest representation was from the counties of Huron, Wellington, Grey, Brant, Oxford, Ontario and Simcoe.

Of the 41 who entered last October, 38 are practical farmers. Of these, 33 are Ontario farmers' sons; and I venture to say that our students as a whole are at the present time as industrious and well-behaved a lot of young men, averaging 21 years of age, as can be found anywhere in the country.

SMOKING IN THE COLLEGE.

Regarding this pernicious habit, I am glad to say that our record for 1891 is excellent. We still have a special room in which those who are determined to smoke can do so in charge of a college officer for three-quarters of an hour after each meal; and of the 132 in attendance, only four have frequented this room during the past year. I may add, as an item of information, that of the twenty-eight medals which we have awarded up to date, twenty-five have gone to non-smokers.

ANALYSIS OF COLLEGE ROLL.

Counties, etc.	No. of Students.	Counties, etc.	No. of Students.
Brant	5	Northumberland	2
British Columbia	1	North-West Territories	2
Bruce	2	Nova Scotia	2
Carleton	2	Ontario	5
Cape Breton	1	Oxford	5
Dufferin	2	Parry Sound District	2
Dundas	1	Poland	1
Elgin	2	Peel	3
England	15	Perth	1
Frontenac	1	Prince Edward County	3
Glengarry	1	Prince Edward Island	1
Grey	6	Quebec	2
Haldimand	3	Rainy River District	1
Hamilton	3	Renfrew	3
Halton	1	Scotland	1
Hastings	1	Simcoe	4
Huron	8	Spain	1
India	1	Toronto	4
Kent	1	Waterloo	5
Lambton	1	Welland	3
Lanark	1	Wellington	7
Lincoln	3	Wentworth	1
Leeds	2	Wisconsin, U.S.A.	1
Lennox	1	York	2
Middlesex	3		
Muskoka	1	Total	132
New Brunswick	1		

RELIGIOUS DENOMINATIONS.

Presbyterians	46	Disciples	2
Methodists	43	Roman Catholics	1
Episcopalians	28	Evangelical Association	1
Baptists	5		
Congregationalists	4	Total	132
Friends	2		

AGE OF STUDENTS.

8	16 years.	7	24 years.
10	17 "	7	25 "
17	18 "	3	26 "
20	19 "	3	27 "
19	20 "	2	28 "
16	21 "	1	29 "
13	22 "	1	31 "
5	23 "		

Average age—21 years.

COUNTY STUDENTS.

Of those in attendance during the year, forty-six were nominated by county councils, and as a consequence were exempted from the payment of tuition fees. The counties represented were the following :

Brant, Bruce, Carleton, Dufferin, Dundas, Elgin, Frontenac, Glengarry, Grey, Hastings, Haldimand, Huron, Kent, Lanark, Leeds, Lennox, Lincoln, Middlesex, Muskoka, Northumberland, Ontario, Oxford, Peel, Perth, Prince Edward, Rainy River District, Renfrew, Simcoe, Waterloo, Welland, Wellington, Wentworth, York.

CLASS ROOM WORK.

Our class-room work has gone on as usual during the past year. All the candidates for degrees were successful in passing their examinations ; and a fair proportion of the first and second year students gained a respectable standing, but the number of failures is still much larger than it should be.

EXAMINERS.

The third year examinations were conducted by the University of Toronto, and those of the first and second years by the professors of the Collage and three other gentlemen to whom we are much indebted,—

E. C. Jeffrey, B.A	English Literature.
W. H. Hunt, B.A	Political Economy.
C. A. Zavitz, B.S.A	Agriculture and Entomology.

BACHELORS OF THE SCIENCE OF AGRICULTURE.

Ten candidates for the degree of B.S.A. were examined in the month of May. These candidates were all successful, and received their degrees at the regular convocation of the University of Toronto, on the 9th of June. The list is as follows :—

Buchanan, D	Hensall, Huron, Ont.
Cowan, J. H	Galt, Waterloo, Ont.
Field, H	Cobourg, Northumberland, Ont.
Hewgill, E. A. (ob)	Heathcote, Grey, Ont.
Hutt, H. L	Southend, Welland, Ont.
Linfield, F. B	Dunlop, Huron, Ont.
Palmer, W. J	Charlottetown, Prince Edward Island.
Sleightholm, J. A. B	Brampton, Peel, Ont.
Sharman, H. B	Stratford, Perth, Ont.
Whitney, C. F	Enfield, Middlesex, Ont.

Recipients of Associate Diplomas.

Fourteen young men, having completed the course of two years, received diplomas admitting them to the status of Associates of the College. The diplomas were presented by the Hon. Richard Harcourt, Provincial Treasurer, at our closing exercises on the 30th of June, and the names of the recipients are as follows :

Carlyle, W. L.	Chesterville, Dundas, Ont.
Gibson, D. Z.	Willow Grove, Haldimand, Ont.
Haight, W. L.	Wellington, Prince Edward, Ont.
Harrison, F. C.	Ronda, Spain.
Marsh, G. F.	Thornbury, Grey, Ont.
McKenzie, A. G	Fairview, Oxford, Ont.
Morgan, R. N.	Kerwood, Middlesex, Ont.
Newcomen, W. F.	Epping, Essex, England.
Perry, E. C.	Smithville, Lincoln, Ont.
Sparrow, J. C. H.	Antrim, Carleton, Ont.
Spencer, W. A.	Salmon Point, Prince Edward, Ont.
Thompson, R. A.	Thornton, Simcoe, Ont.
White, E. F.	Clarksburg, Grey, Ont.
Wilkin, F. A.	Yokohama, Japan.

First-Class Men.

The work in the College is divided into five departments and all candidates who get an aggregate of 75 per cent. of the marks allotted to the subjects in any department, are ranked as first-class men in that department. We would like to have a larger number of such men ; but we are determined that none shall be so ranked unless they really deserve it. The following list contains the names of those who gained a first-class rank in the different departments at the examinations in 1891, arranged alphabetically :

First Year.

1. *Beckett, H. L.*, Hamilton, Wentworth, Ont.—In four departments : Agriculture, Natural Science, English Literature and Mathematics.
2. *Bell, L. G.*, Qu'Appelle, North-West Territory —In three departments : Natural Science, Veterinary Science and English Literature.
3. *Crealy, J. E.*, Strathroy, Middlesex, Ont.—In three departments : Agriculture, Natural Science and Mathematics.
4. *Dyer, W. D.*, Columbus, Ontario, Ont.—In four departments : Agriculture, Natural Science, Veterinary Science and Mathematics.
5. *Harcourt, R.*, St. Ann's, Lincoln, Ont.—In one department : Agriculture.
6. *Harvey, W. H.*, Exeter, Huron, Ont.—In one department : English Literature.
7. *Hurley, T. J.*, Belleville, Hastings, Ont.—In one department : Mathematics.
8. *Shaw, R. S.*, Guelph, Wellington, Ont.—In five departments : Agriculture, Natural Science, Veterinary Science, English Literature and Mathematics.
9. *Soule, A. M.*, Niagara Falls South, Welland, Ont.—In two departments : Agriculture and Natural Science.
10. *Wiancko, A. F.*, Sparrow Lake, Muskoka, Ont.—In one department : Veterinary Science.

Second Year.

1. *Carlyle, W. L.*, Chesterville, Dundas, Ont.—In two departments : Agriculture and Veterinary Science.
2. *Gibson, D. Z.*, Willow Grove, Haldimand, Ont.—In three departments : Agriculture, Natural Science and Veterinary Science.

3. *McKenzie, A. G.*, Fairview, Oxford, Ont.—In one department : Agriculture.

4. *Morgan, R. N.*, Kerwood, Middlesex, Ont.—In two departments : Agriculture and Natural Science.

5. *Wilkin, F. A.*, Yokohama, Japan.—In four departments : Agriculture, Natural Science, Veterinary Science and English Literature.

MEDALLISTS.

Medals were given to the three students who ranked highest in general proficiency in the theory and practice of the second year. The competition was keen, as usual, with the following results :

Gold Medallist.—D. Z. Gibson, Willow Grove, Haldimand, Ont.
First Silver Medallist.—F. A. Wilkin, Yokohama, Japan.
Second Silver Medallist.—R. N. Morgan, Kerwood, Middlesex, Ont.

FIRST YEAR PRIZEMEN.

Agriculture, Live Stock, and Dairying.—1st, R. S. Shaw, O. A. C ; 2nd, J. E. Crealy, Strathroy, Middlesex, Ont.

Natural Science.—1st, R. S. Shaw ; 2nd, L. G. Bell, Qu'Appelle, Assa., N. W. T.

Veterinary Science.—1st, R. S. Shaw ; 2nd, W. D. Dyer, Columbus, Ontario county, Ont.

English Literature.—1st, L. G. Bell ; 2nd, R. S. Shaw.

Mathematics and Book-keeping.—1st, W. D. Dyer ; 2nd, H. L. Beckett, Hamilton, Wentworth, Ont.

General Proficiency.—1st, R. S. Shaw ; 2nd, J. E. Crealy ; 3rd, L. G. Bell.

SECOND YEAR PRIZEMEN.

Agriculture, Live Stock, and Dairying—1st, W. L. Carlyle, Dundas, Ont. ; 2nd, D. Z. Gibson, Haldimand, Ont.

Natural Science.—1st, F. A. Wilkin, Yokohama, Japan ; 2nd, D. Z. Gibson.

Veterinary Science.—1st, W. L. Carlyle ; 2nd, D. Z. Gibson.

English Literature and Political Economy.—1st, F. A. Wilkin ; 2nd, R. N. Morgan.

Mathematics and Book-keeping.—1st, F. A. Wilkin ; 2nd, D. Z. Gibson.

General Proficiency.—1st, D. Z. Gibson ; 2nd, F. A. Wilkin ; 3rd, R. N. Morgan.

Special Prizes for Essays on Fat Stock Show.—1st, R. N. Morgan ; 2nd, E. C. Perry ; 3rd, A. G. McKenzie.

Literary Society Prize for Essay on the O. A. C.—W. J. Palmer, B. S. A., P.E.I.

CLOSING EXERCISES.

Our closing exercises took place on the 30th June. The weather was fine and the attendance large. There were between 400 and 500 people present from Guelph and the surrounding district, many having driven from fifteen to eighteen miles to spend a few hours with us. We were favored with the presence of the Hon. Richard Harcourt, Provincial Treasurer, who delivered a most excellent address to the students and visitors, many of whom had come a long distance to hear him. D. Guthrie, M.P.P., Sheriff McKim, Col. Macdonald, and a number of other leading men from different parts of the county of Wellington, were present and assisted in the presentation of medals and prizes.

VALEDICTORY ADDRESSES.

The second year men chosen by their classmates to deliver the valedictory addresses at the closing exercises, were A. G. McKenzie and R. N Morgan.

CHANGES IN STAFF.

Two changes in our staff have taken place within the year. C. C. James, M.A., who had been our Professor of Chemistry for five and a half years, resigned his professorship to accept the position of Deputy Minister of Agriculture, in the month of June. Prof. James is a first-class chemist, an excellent teacher, and a very superior lecturer, both to students and to farmers. He possesses in a rare degree the faculty of making abstruse scientific truths so plain and simple that even uneducated people can understand them. Hence we were very sorry to lose his services. We are glad, however, that in leaving us he has only gone higher up in the Department with which this Institution is connected.

A. E. Shuttleworth, B. A. Sc., was appointed to take Prof. James' place. Mr. Shuttleworth is an old associate of our own College. After receiving our diploma, he was employed by Professor Brown at experimental work for several years. At length he resigned his position as experimentalist, to take the course in applied science at McGill University ; and on the completion of his course at McGill, he was appointed Professor of Agriculture in the Prince of Wales College, Charlottetown, Prince Edward Island. After his appointment here last June, he went to Harvard for a special summer course in organic chemistry, and returned to commence work with us on the 1st October. So far, Prof. Shuttleworth has given entire satisfaction in his department ; and I have no doubt about the permanency of his success.

The other change referred to was also in the chemical department. George Harcourt, B.S.A., was our assistant chemist under Professor James, and his work was in every way satisfactory ; but when Professor Shuttleworth came west, Mr. Harcourt was appointed professor in the Charlottetown College. Consequently he resigned his position in our College, and we had to select another to fill his place. H. B. Sharman, B.S.A., one of the most promising of our graduates, was chosen to fill the vacancy. Mr. Sharman has been at work since the 1st October, and his record is all that we could desire.

FARMERS' INSTITUTES.

The work of the Farmers' Institutes is still increasing in magnitude and importance. These organisations now embrace nearly the whole province, and are undoubtedly doing a great deal to imporve the methods of farming, disseminate valuable information, and create an intelligent interest in agricultural pursuits.

The list of meetings (112 in number) to be held in January, 1892, as arranged by myself, under instructions from the Minister of Agriculture, and in consultation with Nicholas Awrey, M.P.P., is as follows :

Division No. 1.

John I. Hobson ; W. J. Palmer, B.S A. ; A. McD. Allan.

Durham	S. Grey	Jan.	5, 10 a.m.
Drayton	W. Wellington	"	6, 10 a.m.
Moorefield	W. Wellington	"	7, 10 a.m.
Tara	N. Bruce	"	8, 10 a.m.
Clifford	S. Bruce	"	9, 10 a.m.
Mildmay	S. Bruce	"	11 and 12, 1 p.m. on 11th.
Paisley	C. Bruce	"	13, 10 a.m.
Port Elgin	N. Bruce	"	14, 10 a.m.
Brussels	E. Huron	"	15 and 16, 1.30 p m. on 15th.
Kincardine	C. Bruce	"	18 and 19, 1 p.m. on 18th.
Kippen	S. Huron	"	20, 1 p.m.
Hensall	S. Huron	"	21, 10 a.m.
Clinton	W. Huron	"	22 and 23, 10 a.m. on 22nd.

Division No. 2.

John McMillan, M.P.; H. B. Sharman, B.S.A.; and A. H. Pettit.

Elmira	N. Waterloo	Jan.	5, 10 a.m.
New Hamburg	S. Waterloo	"	6 and 7, 1 p.m. on 6th.
Stratford	N. Perth	"	8, 10 a.m.
Millbank	N. Perth	"	9, 10 a.m.
St. Mary's	S. Perth	"	11 and 12, 1.30 p.m. on 11th
Parkhill	N. Middlesex	"	13, 10 a.m.
Lambeth	E. Middlesex	"	14 and 15, 1.30 p.m. on 14th.
Coldstream	N. Middlesex	"	16, 10 a.m.
Watford	E. Lambton	"	18 and 19, 1 p.m. on 18th.
Appin	W. Middlesex	"	20, 10 a.m.
Kentbridge	E. Kent	"	21, 10 a.m.
Wallaceburg	W. Kent	"	22, 10 a.m.

Division No. 3.

Prof. J. H. Panton; Thomas B. Scott*; Charles Simmons†; T. H. Race.

*Innerkip	N. Oxford	Jan.	5, 10 a.m.
*Tecumseh	N. Essex	"	6, 10 a.m
*Walkerville or Canard River	N. Essex	"	7, 10 a.m.
*Essex	S. Essex	"	8 and 9, 10 a.m. on 8th.
*Tilbury Centre	W. Kent	"	11, 10 a.m.
*Ridgetown	E. Kent	"	12, 10 a.m.
*Rodney	W. Elgin	"	13, 10 a.m.
*Shedden	W. Elgin	"	14, 10 a.m.
†Aylmer	E. Elgin	"	15 and 16, 10 a.m. on 15th.
†Port Rowan	S. Norfolk	"	18, 10 a.m.
†Vittoria	S. Norfolk	"	19, 10 a.m.
†Embro	N. Oxford	"	21, 10 a.m.
†Mount Elgin	S. Oxford	"	22 and 23, 1 p.m. on 22nd.

Division No. 4.

Prof. Thomas Shaw; T. Raynor, B.S.A.; G. W. Cline.

St. George	N. Brant	Jan.	5 and 6, 10 a.m. on 5th.
Oakville	Halton	"	7, 10 a.m.
Stony Creek	S. Wentworth	"	8, 10 a.m.
Hamilton or Ancaster	S. Wentworth	"	9, 10 a.m.
Grimsby	Lincoln	"	11 and 12, 10 a.m. on 11th.
Welland	Welland	"	13, 10 a.m.
Marshville	Monck	"	14, 10 a.m.
Ridgeway	Welland	"	15 and 16, 1 p.m. on 15th.
Dunnville	Monck	"	18, 10 a.m.
Jarvis	Haldimand	"	19 and 20, 1 p.m. on 19th.
Waterford	N. Norfolk	"	21 and 22, 10 a.m.

Division No. 5.

Prof. A. E. Shuttleworth; Joseph Yuill; R. F. Holtermann.

Freelton	N. Wentworth	Jan.	5, 10 a.m.
Acton	Halton	"	6 and 7, 10 a.m.
Brampton	Peel	"	8 and 9, 10 a.m.
Aurora	N. York	"	11 and 12, 10 a.m.
Bondhead	S. Simcoe	"	13 and 14, 10 a.m.
Owen Sound	N. Grey	"	15 and 16, 10 a.m.
Flesherton	C. Grey	"	18, 10 a.m.
Shelburne	Dufferin	"	19 and 20, 10 a.m.
Hillsburg	C. Wellington	"	21, 10 a.m.
Fergus	C. Wellington	"	22 and 23, 1 p.m. on 22nd.

Division No. 6.

C. A. Zavitz, B.S.A.; D. E. Smith, B.A.; and G. C. Caston.

Thornbury	C. Grey	Jan.	5, 10 a.m.
Creemore	W. Simcoe	"	6, 10 a.m.
Duntroon	W. Simcoe	"	7, 10 a.m.
Wyevale	C. Simcoe	"	8, 1 p.m.
Phelpston	C. Simcoe	"	9, 10 a.m.
Orillia	E. Simcoe	"	11 and 12, 10 a.m.
Bracebridge	Muskoka	"	13, 10 a.m.
Parry Sound	Parry Sound	"	15 and 16, 10 a.m.
Utterson	Muskoka	"	19, 10 a.m.
Thessalon	Algoma	"	20 and 21, 1 p.m. on 20th.
Sault Ste. Marie	Algoma	"	22 and 23, 1 p.m, on 22nd.

Division No. 7.

Prof. F. C. Grenside; F. B. Linfield, B.S.A.; and D. W. Beadle.

Tweed	E Hastings	Jan.	5, 10 a.m.
Norwood	E. Peterborough	"	6, 10 a.m,
Keene	E. Peterborough	"	7, 10 a.m.
Warkworth	E. Northumberland	"	8 and 9, 1 p.m. on 8th.
Lakefield	W. Peterborough	"	11, 10 a.m.
Peterborough	W. Peterborough	"	12, 10 a.m.
Bobcaygeon	E. Victoria	"	13, 10 a.m.
Fenelon Falls	E. Victoria	"	14, 10 a.m.
Lindsay	S. Victoria	"	15, 10.30 a.m.
Oakwood	S. Victoria	"	16, 10 a.m.
Brechin	N. Ontario	"	18, 10 a.m.
Beaverton	N. Ontario	"	19, 1 p.m.
Markham	E. York	"	20 and 21, 1 p.m. on 20th.
Weston	W. York	"	22 and 23, 10 a.m. on 22nd.

Division No. 8.

Prof. H. H. Dean* ; W. H. McNish† ; Hon. Charles Drury§ ;
Edward Jeffs‡ ; and A. M. Smith,

*§ Blackstock	W. Durham	Jan.	5, 10 a.m
§‡ Columbus	S. Ontario	“	6, 10 a.m.
§‡ Whitby	S. Ontario	“	7, 10 a.m.
*§ Bowmanville	W. Durham	“	8, 10 a.m.
*§ Harwood	W. North'mberland	“	9, 10.30 a,m.
*§ Grafton	W. North'mberland	“	11, 10 a.m.
§† Ameliasburg	Prince Edward	“	12, 10 a.m.
§† Picton	Prince Edward	“	13, 10 a.m.
§† Napanee	Lennox	“	14 and 15, 1 p.m.
*† Newburgh	Addington	“	16, 10 a.m.
*† Harrowsmith	Frontenac	“	18 and 19, 10 a.m.
*† Delta	S. Leeds	“	20, 10 a.m.
*† Lansdowne	S. Leeds	“	21, 10 a.m.
*† Mallorytown	Brockville	“	22 and 23, 10 a.m.

Division No. 9.

President Mills ; W. S. Fraser ; and W. W. Hilborn.

Perth	S. Lanark	Jan.	5, 10 a.m.
South Finch	Stormont	“	6, 10 a.m.
South Mountain	Dundas	“	7, 10 a.m.
Spencerville	Grenville	“	8, 10 a.m.
Iroquois	Dundas	“	9, 10 a, m
Cornwall Centre	Stormont	“	11; 10 a m.
Lancaster	Glengarry	“	12, 10 a.m.
Vankleek Hill	Prescott	“	13 and 14, 1 p.m. on 13th.
Russell	Russell	“	15 and 16, 10 a.m. on 15th.
Renfrew	S. Renfrew	“	18 and 19, 10 a.m. on 18th.
Almonte	N. Lanark	“	20, 10 a.m.
Bell's Corners	Carleton	“	21 and 22, 1 p.m. on 21st.

Extra Meetings.

John McMillan, M.P., and D. E. Smith, B.A.

Kenilworth	E. Wellington	Jan.	27, 10 a.m.
Guelph	S. Wellington	“	29, 10 a.m.

In this list the speakers are so arranged that, with one or two exceptions, each deputation consists of a professor or other representative of our College, a practical farmer, and a fruit grower. By this arrangement it was thought that the meetings might be made interesting and profitable to all sections and classes of the farming community.

FINANCIAL STATEMENT.

I.—College Expenditure.

(a) *Maintenance.*

1. *Salaries and Wages*	$15,092 30
2. *Food*—	
Meat, fish and fowl	2,599 54
Bread and biscuits	591 25
Groceries, butter and fruit	4,120 37
3. *Household Expenses*—	
Laundry, soap, and cleaning	238 99
Women servants' wages—cooks, laundresses, housemaids, etc.	1,691 31
4. *Business Department*—	
Advertising, printing, postage and stationery	1,164 65
5. *Miscellaneous*—	
Laboratory—chemicals, apparatus, etc.	230 55
Library—books, papers and periodicals	219 19
Medals	68 89
Unenumerated	591 55
	$26,608 59

(b) *Maintenance and Repairs of Government Buildings.*

Furniture and furnishings	$ 988 46	
Repairs and alterations	827 45	
Fuel	2,770 33	
Light	844 26	
Water	650 00	
Sewage disposal	170 61	
		$6,248 11
		$32,856 70

College Revenue.

1. Tuition fees	$1,337 81	
2. Laboratory fees for gas and chemicals used by third year students	120 00	
3. Balances paid for board, after deducting allowances for work on farm, etc.	3,619 28	
4. Fines, breakages, etc	45 79	
5. Charges for supplemental examinations	18 00	
6. Sales of bones	4 45	
		$5,145 33
Net cash expenditure of College		$27,711 37

The net sum voted by the Legislature for the maintenance of the College (see estimates for 1891, pp. 35 and 40) was $28,409. Hence the unexpended balance for the year is $697.63.

II.—FARM

(a) *Farm Proper.*

1. *Permanent Improvements*—		
Fencing, digging well, laying water pipes, grading yards, gravelling lane, etc.		$1,772 40
2. *Farm Maintenance*—		
Salaries and wages	$4,649 53	
Live stock imported from Great Britain	6,545 14	
Live stock—cows, steers, lambs, etc.	4,440 34	
Maintenance of stock	4,160 88	
Seeds	196 53	
Manures	126 67	
Binding twine	32 50	
Repairs and alterations—lumber, blacksmithing, etc.	647 54	
Furniture and furnishings	233 05	
Implements	560 93	
Advertising, printing, postage and stationery	374 31	
Fuel and light	306 02	
Contingencies	318 67	
		$22,592 11
		$24,364 51
Farm revenue		6,054 88
Net expenditure of farm proper		$18,309 63

(b) *Experiments.*

Salaries and Wages—	
Assistant Superintendent of Experiments	$999 99
Special assistant (part wages)	233 31
Experimental feeder	399 96
Labor	1,466 78
	$3,099 94
Seeds	222 05
Manure and special fertilisers	104 05
Team of horses	273 14
Furniture, furnishings and repairs	459 31
Printing, postage, stationery, etc	92 17
Implements	53 12
Feed and fodder	25 44
Exhibitions	394 35
Expenditure for farm experiments	$4,723 57

III.—EXPERIMENTAL DAIRY.

Salaries and Wages—	
Assistant	$500 00
Man to milk, take care of cows and pigs, etc	322 68
Temporary assistance	16 00
	$838 68

Live stock—cows and pigs		$174 85
Feed and fodder		475 51
Furniture, furnishings, and repairs		566 59
Laboratory expenses—gas, chemicals, etc.		37 32
Printing, postage, and stationery		54 33
Contingencies		9 40
Dairy appliances—cream separator, creamers, vats, milk testers, butter workers, etc.		501 10
Expenses *re* travelling dairy		1,412 43
		$4,070 21
Less Dairy Revenue—		
Cows sold (capital)	$80 00	
Pigs	289 88	
Calves	71 50	
Butter	530 34	
Milk	102 90	
Cream	19 33	
		1,029 95
Net expenditure of Experimental Dairy		$3,040 26

V.—GARDEN, LAWN, ETC.

Salaries and Wages—	
Foreman	$700 00
Gardener	456 00
Assistant gardener (8 months)	283 00
Teamster	322 50
Laborers	1,165 50
	$2,927 00
Manure	74 90
Seeds, bulbs, plants, trees, etc.	138 11
Furniture, furnishings, and repairs—tools, implements, flower pots, etc.	307 81
Fuel and light	1 44
Contingencies	12 20
	$3,461 66
Less cash revenue (some vegetables sold)	83 35
Net expenditure of the Horticultural Department	$3,378 31

The sum voted for this department was $3,394. Hence the unexpended balance for the year is $15.69.

VI.—MECHANICAL DEPARTMENT.

Salary of foreman	$700 00
Lumber, nails, oil, paint, etc	27 89
Tools, etc.	17 69
Fuel and Light	7 47
Expenditure of Mechanical Department	$753 05

The sum voted for this department was $1,180. Hence the unexpended balance for the year is $426.95.

Total net expenditure for maintenance in all departments in 1891.

College	$27,711 37
Farm Proper	18,309 63
Farm Experiments	4,723 57
Experimental Dairy	3,378 31
Garden, Lawn, etc.	3,378 31
Mechanical Department	753 05
	$58,254 19

VII.—College in Account with Farm and Garden.

(a) *With Farm.*

To 417 bushels of potatoes, at 40c	$166 80
" 52 bushels turnips, at 12c.	6 24
" 3,552 gallons milk, at 12c.	426 24
" feed for College horse (without attendance)	75 00
" feed for Bursar's horse (without attendance)	75 00
" carpenter work by students	20 00
" cartage for College, offset by College slops used by Farm	
	$769 28

(b) *With Garden.*

To fruit and vegetables supplied from time to time		592 02
		$1,361 30
By amount paid by College for student labor on Farm and Garden (mostly on Farm)	$2,945 87	
" half of Farm Superintendent's salary	1,000 00	
		3,945 87
" balance to credit of College		$2,584 57

Buildings Still Needed.

Though valuable and much needed additions have been made to our buildings within the past year, we still require three or four more to enable us to do fully and satisfactorily the work we have on hand. Those most needed are the following :

(1) A piggery for the Farm, and one for the Dairy Department.

(2) New stables for the Dairy Department.

(3) Houses for the Professor of Chemistry, of Natural History, and of Dairying, and one for the Assistant in the Dairy Department.

(4) An Experimental building.

Hoping that you may find it possible to erect some of these buildings before the close of 1892,

I have the honor to be, Sir,

Your obedient servant,

JAMES MILLS,
President.

PART II.

REPORT OF THE
PROFESSOR OF NATURAL HISTORY AND GEOLOGY.

To the President of the Ontario Agricultural College:

SIR,—I herewith present to you my report bearing upon matters pertaining to the Department of Natural History.

1. COLLEGE MUSEUM.

The principal thing to be noticed in connection with the museum, is the addition to it of a most valuable collection of minerals obtained by purchase from the executors of the estate of the late John Notman, Esq., Toronto. His collection of minerals and curios of different kinds was very extensive indeed, for a private individual, and was well known on account of its being frequently on exhibition at our Provincial exhibition. His death led to the placing of the collection upon the market. Having been requestd by you to make an inspection of it and report upon its use in our museum, I did so, and the result was you purchased the geological portion of this unique collection, and it now forms a most attractive part of our museum. The following brief description will enable the reader to form some opinion of the value of these specimens as a means of illustration:

Case 1.—Specimens illustrating the manufacture of glass and chinaware.

Case 2.—A very fine collection of agates and amethysts; some very valuable specimens, large and unique in character.

Case 3.—Contains a series of fragments of coal and graphite.

Case 4.—Iron ores.

Case 5.—Lead ores.

Case 6.—Copper ores.

Case 7.—Silver ore from some of the most valuable mines in Canada, and also from mines in other parts of the world.

Case 8.—Contains a very valuable series of gold ore and precious stones. Many of the specimens in this case are worth a considerable sum of money.

Case 9.—Specimens of the various kinds of marbles.

Case 10.—Chiefly fragments of granite.

Case 11.—Most instructive specimens of apatite (phosphate of lime), used in manufacture of mineral superphosphates.

Case 12.—Equally interesting, with portions of gypsum rock, showing the different varieties of this mineral.

Case 13.—A series of clay deposits.

Case 14.—Varieties of asbestos.

Case 15.—Lava from many volcanoes.

Case 16.—Varied in its character.

Case 17.—Excellent series of specimens of mica.

Case 18.—Somewhat varied; no predominating mineral.

Case 19.—Feldspars of different varieties.

Case 20.—A unique collection of fossils, so distinct and so readily identified that the most illiterate would have no difficulty in recognising them to be relics of life entombed in the rocks.

Besides the specimens referred to in the above cases, many very excellent ones were distributed among the cases we have in the museum, illustrating the systems into which the earth's crust has been divided by geologists.

To arrange all these specimens has been no small task, and has occupied much of my spare time when not engaged in the lecture room.

I had hoped to secure a good collection of weed seeds during 1891, to be used in connection with our specimens of weeds, but have not met with the success desired. However, the subject will receive future consideration as time permits.

The skull of an extinct animal allied to the beaver, donated to the museum by John Jelly, Esq., Shelburne, is a specimen of more than ordinary interest. It was found associated with the remains of a gigantic mastodon discovered in western Ontario, near High gate.

2. Library.

Several useful volumes have been added this year, and our list is gradually embracing a valuable collection of books for students reading along the lines of agricultural science.

One of the most valuable additions to our library in 1891 is the handsome donation made by Sir John Bennet-Laws, of Rothamsted, England. It consists of six octavo and three quarto bound volumes of "The Rothamsted Memoirs on Agricultural Chemistry and Physiology."

Professor J. H. Gilbert, so long associated with him in experimental work, also presented to the library a valuable volume, "Occasional Lectures and other Discourses on Agricultural Chemistry." It would be difficult indeed to estimate the value of these books, containing the results of such distinguished pioneers in the solution of many problems of great importance to the agriculturist. These books might well be described as the classics of scientific research in agricultural science. We are greatly indebted to those gentlemen for such a valuable gift and hope our students will often resort to these books and in them find much that is pre-eminently suited to advance their studies in the department of agricultural science.

The library has had 125 volumes added during the year ; these may be grouped as follows :

Reports, chiefly agricultural, 39 ; Natural History, 2 ; Veterinary, 1 ; Agriculture, 28 ; Chemistry, 4 ; Literature, 10 ; Encyclopædias, 2 ; Botany, 6 ; Geology, 2 ; History, 6 ; General Science, 4 ; Parliamentary reports, 12 ; Mathematics, 2 ; Dairying, 2 ; Travels, 1 ; Biography, 4.

During this year I have endeavored to compile an index to some of the most valuable of the agricultural reports, and have now completed indexes of reports published by :

1. The Agricultural Department of the United States Government, Washington.
2. Reports of Agricultural Department, State of Connecticut.
3. Reports of Agricultural Department, State of Michigan.

3. Reading Room.

This is one of the most commodious and pleasant rooms in the College, and is becoming yearly more used for the purpose it was intended. It is well furnished for reading and study ; excellent tables and chairs, and convenient reading desks, upon which are found the best agricultural journals published, a list of which is given below.

The following is a list of papers, journals and magazines which come to the College, and are for the use of the students in attendance :

(a) *Sent free by the Publishers.*

Name.	Where published.
1. Journal of Commerce	Montreal.
2. Canadian Baptist	Toronto.
3. Christian Guardian	"
4. Canada Presbyterian	"
5. Monthly Weather Review	"
6. Presbyterian Review	"
7. Sheep Breeder and Wool Grower	Chicago.
8. Manitoba Weekly Free Press	Winnipeg.
9. Canadian Horticulturist	St. Catharines.
10. Canadian Entomologist	London, Ont.
11. Bee Journal	Beeton.
12. North York Reformer	Newmarket.
13. Acton Free Press	Acton.
14. Ontario Evangelist	Erin, Ont.
15. Evangelical Churchman	Toronto.
16. Montreal Witness	Montreal.
17. Farmers' Review	Chicago.
18. Welland Tribune	Welland.
19. Paris Transcript	Paris.
20. Canadian Independent	Toronto.
21. Rural Home Journal	Kentucky.
22. Canadian Churchman	Toronto.
23. " Independent	"
24. " Evangelist	"

(b) *Furnished by the College.*

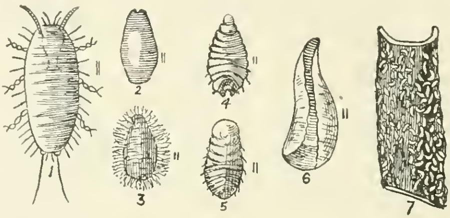
1. Daily Globe	Toronto.
2. " Mail	"
3. " Empire	"
4. " Mercury	Guelph.
5. " Herald	"
6. Rural Canadian	Toronto.
7 Grip	"
8. Poultry Review	"
9. Farmers' Advocate	London, Ont.
10. Canadian Stock Raisers' Journal	Toronto.
11. Nor'-West Farmer	Winnipeg.
12. Breeders' Gazette	Chicago.
13. North British Agriculturist	Edinburgh Scotland.
14. American Garden	Greenfield, Mass.
15. American Naturalist	Philadelphia.
16. Veterinary Journal	London, England.
17. Cultivator and Country Gentleman	Albany, N.Y.
18. Scientific American	New York.
19. Live Stock Journal	England.
20. American Dairyman	New York.
21. Botanical Gazette	Crawfordsville, Indiana.
22. Agricultural Science	Geneva, N.Y.
23. Canadian Honey Producer	Brantford.
24. Literary Digest	Boston.
25. Entomological News	Philadelphia.
26. Canadian Agricultural and Home Magazine	Peterboro.
27. Hoard's Dairyman	Ft. Atkinson, Wis.
28. Maritime Agriculturist	New Brunswick.

The following bulletins have been issued from this department during 1891 :

OYSTER-SHELL BARK-LOUSE AND THE PEAR-TREE SLUG.

This bulletin has been prepared with the object that it may prove of practical importance not only to those who have asked information upon the subject, but also to many others in the province whose orchards are infested by these pests.

OYSTER-SHELL BARK-LOUSE (*Mytilaspis pomorum*).—This minute insect, found upon the bark of the small twigs of the apple tree, is readily identified by its oyster-shell shaped scale, about one-sixth of an inch in length. This scale is of a brown color, and thus disguised by the bark is not seen unless by close observation. Usually a good many are clustered together, and their shape is so marked that we soon recognize them. Though largely found upon the twigs, they are also found upon branches and limbs of considerable size. If the scales be raised up and examined beneath any time in the fall or winter, numbers of very small white particles will be observed, which on close examination will prove to be eggs. Here beneath the peculiarly oyster-shell shaped scales they remain until early in the summer. As soon as the weather is favorable, especially about the end of May or the beginning of June, the tiny eggs hatch, and out from beneath the scale issue the bark-lice, which are exceedingly small. They scatter themselves over the twigs of the tree, seeking suitable spots for further development. Having found such the minute insects fix themselves upon the tender growing bark. This they pierce with the beak-like structures connected with their mouths, and by means of which they are able to suck the sap from the twig or branch upon which they are located. Once fastened to the twig they remain attached and do not move about; consequently this continual drain upon the tree's sap, especially when they are numerous, soon affects its vitality. It is not an uncommon thing to see a branch almost completely covered with the scales. Permanently fixed, they continue feeding from the sap of the tree until towards the end of August or September; by this time they have reached full size and gradually form the scale by means of wax-like threads that issue from their bodies, and which eventually make the scale. Under these the female deposits her eggs, and by the time her work is completed she has shrivelled up to a mere speck and her existence is at an end. At this stage an examination of the scale beneath would show a mass of tiny eggs, with little or no trace of the insect that laid them. The scales we see are almost invariably those formed by the females; those of the male being seldom seen, and then most frequently upon the leaves. They are much smaller in size and somewhat different in shape. The peculiar nature of bark-lice prevents to a great extent their spreading from tree to tree, and in many cases no doubt they have been upon the trees when first planted, but have not been observed till, it may be, years afterwards, when they have multiplied so as to cover the branches and be readily seen. They may be carried to some extent from tree to tree by birds, and also by other insects at a time when they are in search of proper places for location. Such is the life-history of this bark-louse, which seems to be rapidly spreading over the country.



Oyster-shell Bark-louse. *1. Insect. 2. Egg. 3. Forming scale. 4 and 5. Further development. 6. Scale. 7. Scales on bark of twig.* on right of first six cuts denotes natural size.

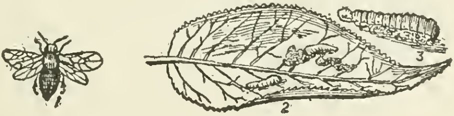
Remedies.—We shall now suggest some remedies for its destruction :

1. Examine infested trees carefully during May and the beginning of June, and as soon as the tiny lice are seen crawling about spray the tree with the following kerosene emulsion : one half pound of hard soap in one gallon of boiling water ; to this add two gallons coal oil and thoroughly mix. This on cooling, if well mixed, will form a jelly-like substance. When about to use, add nine parts cold water and spray upon the trees. Thorough mixing can be effected by forcing the mixture through a force pump with a small nozzle until the whole forms a creamy mass.

2. In the winter and spring scrape off the trunk and larger branches as many of the scales as possible, and then thoroughly scrub with a scrubbing brush or broom dipped in the following solution : one quart of soft soap or one pound of hard soap, in two gallons of boiling water. To seven parts of this add one part of crude carbolic acid.

3. Soft soap made about as thick as paint by adding a strong solution of washing soda in water. This applied to the trunk and limbs improves the vigor of the tree as well as gets rid of the bark-lice.

Pear-tree Slug (*Selandria cerasi*).—The eggs of this insect are usually deposited early in June in the leaf, which appears marked with semicircular incisions. These have been made by a peculiar structure which the female has for the purpose. The eggs soon hatch and the young slug develops until it reaches about one-half an inch in length. It presents an unattractive appearance, being somewhat blackish or bottle green in color, covered with an olive-colored slime. The front part of the body is swollen, and the slug resembles a tadpole in appearance. It has a disagreeable odor. During the slug period of its existence it feeds upon the foliage of the pear, cherry and plum, and in some places becomes a serious trouble. The larval condition being completed, it leaves the tree and spends a portion of its existence in the ground, from which in due time it emerges the perfect insect—a fly of a glossy black color with four transparent wings and dull yellow legs. The female is about one-fourth of an inch long and the male somewhat smaller. The first appearance of the slug is near the end of May until the middle of June, but another brood may appear near the end of July or August. The cherry and pear trees should be examined for these troublesome insects about the middle of June, and again early in August. They are very voracious and can soon destroy the foliage of a tree. When attacked the leaves wither and look as if scorched by fire.



Pear-tree Slug. *1. Insect. 2. Slugs feeding on leaf. 3. Slug, enlarged size.*

Remedies.—The following remedies are suggested :

1. Syringe with hellebore mixed with water in the ratio of an ounce to two gallons.
2. Syringe with Paris green, one teaspoonful to two gallons water.
3. Dust upon the foliage fresh air-slaked lime.

GINSENG (ARALIA QUINQUEFOLIA.)

An Act of Parliament, having been passed at the last meeting of the Ontario Legislature, for the protection of the plant ginseng, the Minister of Agriculture has thought it advisable to have the following bulletin published, containing a description of the plant, so that the people of Ontario may be better acquainted with a plant of so much economic value and to a certain extent comparatively common throughout our province, though unknown to many.

The following are the clauses of the bill, from which it will be seen that the plant cannot be picked before September 1st, so as to enable it to ripen its fruit:

1. Except for the purpose of clearing or bringing land into cultivation, no person shall, between the first day of January and the first day of September in any year, cut, root up, gather or destroy the plant known by the name of ginseng whenever such plant may be found growing in a wild or uncultivated state.

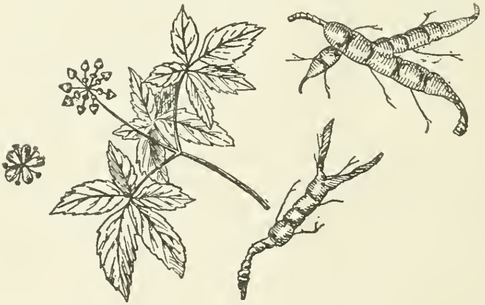
2. Any person who contravenes the provision of this Act shall, for every such offence, upon summary conviction before any justice of the peace, be subject to a penalty of not less than $5 or more than $20, together with costs for prosecution, and one-half of such penalty shall be paid to the prosecutor, unless otherwise ordered by the said justice convicting.

BOTANICAL DESCRIPTION. Ginseng (*Aralia quinquefolia* formerly *Panax quinquefolium*) belongs to the order Araliaceae, a family of plants closely allied to the order in which we find such plants as the carrot, parsnip and celery. Root large and spindle-shaped, often forked, four to nine inches long, aromatic; stem one foot high, herbaceous, bearing a whorl of three palmately, 5-7 foliage leaves; the leaflets long stalked, mostly five in number, large and thin, obovate-oblong, pointed and serrate; a simple umbel of flowers upon a single, slender, flower stalk; flowers from June to August with small yellowish flowers followed by fruit as bright red berries.

POPULAR DESCRIPTION. Main stem about one foot long, branches into three stalks at the summit, each three and one-half inches long; on the end of each of these are arranged five leaflets borne on slender stalks an inch in length. The leaflets are thin, smooth below and of delicate structure; two in each cluster are about two inches long and the others almost four, oval in general form, but tapering to a point, and doubly toothed along the edge. Rising from the main stem and in the centre of the three compound leaves is a stalk three inches long bearing inconspicuous greenish white flowers, appearing not unlike a small head of white clover.

This single flower stalk is an important point, for I have found some calling a plant of this family ginseng (Aralia quinquefolia) which had four flower stalks and belonged to an entirely different species, though of the same genus.

The root of a specimen in the College herbarium is quite fleshy, rather short (three inches) and from it arises the single stem already described. By means of the above description, technical and popular, together with the accompanying cut the reader will readily identify the plant ginseng from other plants in the vicinity.



GINSENG (*Aralia quinquefolia*).

HISTORY OF GINSENG. The genus Panax was first applied to it, and not Aralia; this was, no doubt, on account of its being considered by the Chinese as a panacea for all diseases. The name of the plant, among both the Chinese and the North American Indians, means, in their language, the figure of a man, and was given to it from a fancied resemblance of the human figure. In fact, much of its virtue seems to depend upon its form. With us there is little faith in its medicinal power, but the Chinese have unbounded belief in it and hence are eager to secure it. The emperor of the Chinese at first monopolised the right of collecting the roots, and whole districts were carefully guarded against any one gathering it, except the 10,000 he employed for the purpose. Each of these collectors in the year 1709 was bound to furnish two ounces free, and then was at liberty to sell the rest to the emperor for its weight in silver. If the root had the form of a human being it could be sold for its weight in gold. Even to-day great prices are paid for large and curiously shaped specimens, especially if they resemble the human figure. It was first discovered in Canada, near Montreal in 1716, by Father Lafitau, a Jesuit missionary among the Iroquois, and in 1718 a description of it was furnished. The French soon engaged in collecting and exporting it to China, and so great did the trade become that it gave quite an impulse to the commerce of Montreal for a number of years. At one time great numbers of Indians were engaged in gathering it about Montreal and Quebec and large quantities of it were sent to China. In 1832 the shipments of ginseng from the United States amounted to 407,067 pounds, valued at $99,303. In one county in Wisconsin the trade is reported to have reached in 1858 $40,000, and in 1859 $80,000. Immense quantities have been exported from Minnesota. At present the chief sources of the plant in the States are Ohio, West Virginia and Minnesota. About the close of the eighteenth century it was discovered also in Massachusetts, its exportation commenced and large returns obtained. During the last year 75,000 pounds were sent from America. In the forests of Tartary, where it was once plentiful, it is now almost extinct and hence has arisen the demand for it from America. It is not regarded of any value in this country as a medicine. Some are fond of chewing it as the taste is rather agreeable, being sweet, bitter, somewhat aromatic and pungent. The fact that Chinese doctors claim that the roots of different shape possess widely different medicinal properties indicates that its healing virtues are more of an imaginary character than real. But faith in its virtues continues, and as yet a great demand for it exists. The Chinese physicians introduce it into almost all their prescriptions for the nobility, to heal the sick and increase the vigor of the healthy.

A traveller in China remarks, he never entered a drug shop but ginseng was being sold. Volumes have been written by Chinese doctors upon its medicinal powers. asserting that it gives ready relief in extreme fatigue, renders respiration easy, strengthens the stomach, promotes the appetite, relieves all nervous affections and gives a vigorous tone of body, even in extreme old age.

The following figures taken from the *Canadian Pharmaceutical Journal*, April, 1891, will give some idea of the trade in ginseng in Canada:

The quantity sent out of Canada last year is stated to represent $100,000, and one retail druggist exported $1,600 worth. From along the Kingston & Pembroke Railroad fully $20,000 worth was shipped. The price realised was from $3 to $3.50 per pound for dry roots. The question is now being considered whether it would not pay to cultivate it. Such is done in some parts of the United States, and in order that readers of this bulletin may understand how to do it, the writer inserts a description of the process taken from the December issue of the *American Agriculturist*:

CULTIVATION. "It appears to thrive best in loamy soils, such as are usually found in sugar maple and oak forests at the North. Shade seems also to be essential, for when the plants are exposed to the direct rays of the sun they soon die out, and foi this reason open field or garden cultivation of the plants has rarely or never been attended with success. The proper way to start a plantation is to select a piece of land at the edge of some forest where the plants are found growing wild. Then clear out all the underbrush and small trees, leaving just enough of the larger ones to afford the shade required. This should be done in spring or during the summer, then break up the surface of the soil with a harrow, steel rakes, hoes, or other implements to the depth of two or three inches, removing all weeds, grasses and their roots. The bed thus prepared will be ready for the reception of seeds and small unsaleable roots as collected in the autumn, the season of ripening depending somewhat upon latitude.

"Ginseng berries are of a crimson color when ripe, each containing two seeds, produced in small clusters at the top of a central peduncle elevated above the principal leaves. When gathering the seed the roots may also be dug up, and all small and unsaleable ones preserved and replanted in the prepared bed. The seed should be rubbed from the pulp very carefully with the hand, and then sown, or better pressed into the ground with the finger about half an inch deep, and one every six inches along the row. The rows should be from one to two feet apart for convenience of removing weeds, should any appear. Both seeds and plants should be in the ground before hard frosts occur in autumn, for when these come the leaves of the large trees will fall on the bed and give the natural protection required.

"The following season no cultivation will be needed—if the bed is thinly covered with leaves—except to cut out sprouts and remove any large coarse weeds which may spring up from seeds or roots left in the ground. If winds blow away the leaves needed as a mulch, a few old dead branches of trees may be scattered about to hold the mulch in place. At the end of the third season the roots will have reached a marketable size and may then be dug, and the same bed worked over and restocked with seeds or small plants. Some who have tried it say that raising ginseng can be made profitable where a man has suitable land in a forest or grove near at hand. The cost of preparing a bed cannot be very much and the seed can be obtained from the wild plants in our forests."

DISTRIBUTION. Ginseng has a wide distribution, and is found usually in upland woods and not in swamps or low lying districts. It appears to thrive well in localities where limestone abounds. It frequently occurs in beds from which several pounds of roots may sometimes be gathered. As cattle are fond of the leaves it soon becomes scarce in woods to which they have ready access. It is comparatively common in Ontario where conditions are found favorable to its growth. Macoun, in his report on Canadian plants, gives it as found at the following places: Near Montreal, Beloeil Mountain, Prescott, Kingston Mills, Picton, Belleville, Seymour, Brighton, Sydney, Owen Sound, Amherstburg, London, Hamilton, Woodstock and Ottawa. It has lately been found near Toronto, and occurs in many places as yet unreported.

METEOROLOGY.

REPORT OF OBSERVATIONS TAKEN AT THE ONTARIO AGRICULTURAL COLLEGE DURING 1891.

Observations are regularly taken at the hours of 7 a.m., 1 p.m., and 9 p.m. daily and recorded in a book printed for the purpose. The instruments in use are as follows:

Barometer--Showing the atmospheric pressure at the time of observation.

Maximum thermometer—Indicating the highest temperature between times of observation.

Minimum thermometer—Indicating the lowest temperature between times of observation.

Pluviameter—Used in measuring the rainfall.

Thermometer—For observing ordinary temperature.

Besides taking observations from these instruments, the cloudiness of the sky is observed, and general remarks on the weather for the day are recorded in the daily register. At the close of each month a summary of the month's observations is made out. From these summaries the statement of the year's meteorology is completed.

It is with much pleasure I notice as the year draws to a close that there is every prospect of our occupying a new botanical laboratory before 1892 is much advanced. This is a want that has long been felt for the better equipment of the department in Natural History, and places us now in a position that we may expect to compete more favorably with other institutions in the teaching of Botanical Science. We should have a grant of at least $400 to be expended in apparatus for work in connection with this new laboratory, and I hope you will be successful in securing it.

Yours respectfully,

J. HOYES PANTON,
Professor of Natural History

O.A.C. GUELPH,
DECEMBER 31st, 1891.

MEAN METEOROLOGICAL RESULTS FOR THE YEAR 1891.

—	1891 — GUELPH.	Average of 40 years. — TORONTO.
BAROMETER.		
Month of highest mean pressure	Sept. and Oct. equal.	September.
Highest mean monthly	28.956	29.664
Lowest " "	28.063	29.572
Month of the lowest mean	November.	June.
Highest pressure	29.498	30.358
Lowest pressure	28.022	28.692
THERMOMETER.		
Mean temperature of the year	43.6°	44.17°
Warmest month	June.	July.
Mean temperature of the warmest month	66.4°	67.64°
Coldest month	January.	February.
Mean temperature of the coldest month	22.3°	22.73°
Highest temperature	95.0°	91°
Lowest temperature	.3°	−11.9°
Range of the year	94.7°	102°
PLUVIAMETER.		
Total depth of *rain* in inches	26.5	28.30
Number of days on which *rain* fell	81	110
Month in which the greatest depth of *rain* fell	November.	September.
Greatest depth of *rain* in one month	5.1	3.55
Month with most *rainy* days	Feb., April and Aug. equal.	October.
Greatest number of *rainy* days in one month	8	13
Total depth of *snow* in inches	55.6	
Number of days on which *snow* fell	32.0	
Month in which the greatest depth of *snow* fell	March.	
Greatest depth of *snow* in one month	21.7	
Month with most *snowy* days	March.	
Greatest number of *snowy* days in one month	12	
Total precipitation in inches	32.06	

Normal height of barometer at Guelph (1,100 feet above sea level and 858 feet above Lake Ontario) 28.86 inches. Latitude north 43° 38′.

SUMMARY OF THE METEOROLOGICAL RESULTS AT GUELPH FOR 1891.

—	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
Barometer.	inches.	inches.	inches.	inches	inches.	inches.	inches.	inches.	inches.	inches.	inches.	inches.
Highest barometer	29.400	29.408	29.340	29.238	29.106	29.170	29.210	29.050	29.498	29.473	29.322	29 400
Lowest barometer	28.106	28.132	28.090	28.448	28.704	28.550	28.340	28.436	28.022	28.501	28.222	28.452
Highest mean barometer	29.386	29.365	29.182	29.205	29.076	29.123	29.161	29.026	29.259	29.164	29.166	29.365
Lowest mean barometer	28.170	28.369	28.275	28.487	28.732	28.568	28.446	28 518	28.677	28.667	28.016	28.368
Monthly mean barometer	28.661	28.763	28.851	28.809	28.905	28.835	28.838	28.948	28.956	28.956	28.063	28.827
Monthly range	1.294	1.276	1.250	.790	.402	.620	.870	.614	1.476	.972	1.100	0.948
Thermometer.	degrees.	degrees.	degrees.	degrees.	degrees.	degrees.	degrees.	degrees.	degrees.	degrees.	degrees	degrees.
Highest thermometer	43.	49.4	50.7	86.3	80.4	90.1	95.0	93.	89.5	82.5	79.3	70.0
Lowest thermometer	2.4	.3	.4	16.6	26.0	37.8	39.	39.	28.	21.5	4.5	5.0
Highest mean thermometer	33.9	39.3	37.5	61.6	64.9	80.2	74.9	78.3	70.5	64.1	54.8	42.5
Lowest mean thermometer	6.6	2.4	11.3	22.0	31.5	47.4	52.1	53.4	45.2	29.3	10.7	8.0
Monthly mean temperature	22.3	24.8	23.9	42.4	50.4	66.4	62.7	63.7	61.2	44.3	32.7	28.7
Monthly range	40.6	49.1	50.3	69.7	54.4	52.3	56.0	54.0	61.5	62.0	74.8	65.0
Pluviameter.												
Number of days rain fell	7	8	6	8	6	7	7	8	7	6	7	4
Number of days snow fell	8	6	12	1	1	....	....	....	....	....	3	3
Greatest rainfall, inches	.89	.40	.25	.36	.24	.6	.88	2.25	.92	.60	1.10	1.6
Rainfall for month, inches	1.72	1.64	.79	1.47	.68	1.15	3.54	3.96	2.62	1.70	5.1	2.14
Greatest snowfall, inches	4.5	4.0	4.0	.10	.01	....	....	....	....	....	3.0	2.00
Snowfall for month, inches	16.2	7.6	21.7	.1	.01	....	....	....	....	....	6.00	4.00
Total precipitation	3.34	2.40	2.96	1.48	.68	1.15	3.54	3.96	2.62	1.70	5.7	2.54

PART III.

REPORT OF THE PROFESSOR OF CHEMISTRY.

ONTARIO AGRICULTURAL COLLEGE
GUELPH, December 31st, 1891

To the President of the Ontario Agricultural College:

SIR,—In submitting to you my first report as Professor of Chemistry, I beg to make a few introductory remarks in reference to study and work in this department.

Since my acquaintance, as an undergraduate, with the College in 1879, vast improvements have been made in the Chemical Department. The new laboratory, with its convenient and comfortable lecture and analytical rooms, constructed in the time of my esteemed predecessor, Professor C. C. James, will enable me to undertake the work of this department with advantage. Each year, as the work of the Experimental Department develops, it becomes more needful to have a well equipped analytical laboratory, that the two departments may work hand in hand. For this reason, and on account of the greater demands occasioned by an increasing third year class, it will require a larger grant to meet the requirements of the Chemical Department.

FIRST YEAR CHEMISTRY.

This class is larger and, with a very few exceptions, its members are just commencing the study of chemistry. To some extent the method—introduced last year—of teaching elementary chemistry has been followed. But in order that the students may learn how apparatus should be handled and experiments performed, and that they may receive a proper conception how to study the science of chemistry, more attention, at the beginning, will be given to class lectures with experiments conducted by the teacher. Gradually, as the students become prepared, more time will then be devoted to laboratory practice, with experiments performed by the students.

SECOND YEAR CHEMISTRY.

An effort will be made to give the students of the second year more laboratory practice than heretofore. It is desirable also to provide a room and means whereby soils and artificial manures may be handled and studied practically.

THIRD YEAR CHEMISTRY.

Chemistry, both theoretical and practical, forms a large and important part of the work of the third year. To cover this work properly, students on entering the third year must be fairly well advanced in theoretical chemistry and acquainted with the practice of qualitative analysis. If more attention during the first and second years is given to the study of chemistry, this can be accomplished.

INCREASED ROOM REQUIRED.

In order to give the several classes the desired laboratory practice, increased room will be required. If the number entering the third year increases as it now promises, it will be necessary to devote our present laboratory room to third year students. Interruption and crowding hinder and defeat the efforts of students doing delicate analysis. I would, therefore, recommend that the room, now used by the Experimental Department, in the basement of the laboratory building, be fitted up as a practical room for the first and second year students. If this were done, ample accommodation would be afforded for all our classes. The cost, carefully estimated, should not exceed $200.

The pipe supplying water to the laboratory is in direct communication with the main water pipe; and, as a result, the water pressure in the laboratory is irregular, and the supply is frequently shut off for hours. This gives daily annoyance, hinders our work, and frequently breaks apparatus. The construction of a water-tank in the upper part of the laboratory, affording a constant and regular pressure, would remove all these difficulties. Such a tank as is required should not cost more than $35.

SUGAR BEETS.

In accordance with a letter dated October 20th, 1891, a number of blank forms were printed and mailed to parties who grew sugar beets this year. These forms called for information regarding character of soil, cultivation, yield, etc. Each grower filled in a form which was returned to us accompanied by five average beets. As the samples arrived, the green parts on which leaves grew were carefully trimmed off, the beets were then washed clean and allowed to dry. Afterwards each sample was accurately weighed; and from these weights the average net weight was calculated. Thirty-six samples were received, all in good condition, except two from Walkerville. These having been unfortunately overlooked in the express office had wilted.

The seed of this year's growth was distributed in the spring by the Department of Agriculture, Toronto. It was the same variety as that sent out last year—see Annual Report of 1890, p. 67. The method of analysis was the same as in 1889-91; and the results are given in the same form. The great value of the analysis of this year is that it confirms the results of previous investigations, and enables us to obtain a three years' average. The following table gives separately the averages for 1889-90-91, and also the average of these three years taken together.

——	No. of samples.	Average weight.		Solids in juice.	Sugar in juice.	Purity of juice.
		lb.	oz.			
Average of results for 1889	26	2	2	18.95	14.35	75.70
" " " 1890	117	1	4	17.12	13.58	79.32
" " " 1891	32	2	2.8	16.76	13.53	80.35
		lb.	oz.			
" of three years	175	1	13.6	17.61	13.82	78.46

Following this table, is one giving similar averages of the Ontario Experimental Farm product, comparing these averages with the Ontario average in which the O. E. Farm product is included.

BEETS GROWN BY THE ONTARIO EXPERIMENTAL FARM.

——	No. of samples.	Net avervage weight.		Solids in juice.	Sugar in juice.	Purity of juice.
		lb.	oz.			
Average for 1889	1	2	1½	21.50	18.00	83.70
" " 1890	1	1	0½	18.03	15.08	83.64
" " 1891	5	1	10.7	18.12	14.94	82.48
" of 1889-'90-'91	7	1	12.9	19.22	16.01	83.27
" " Ontario for 1891	....	2	2.8	16.76	13.53	80.35
" " O. E. Farm for 1891	....	1	10.7	18.12	14.94	82.48
" " Ontario for 1889-'90-'91	....	1	13.6	17.61	13.82	78.46
" " O. E. Farm for 1889-'90-'91	... .	1	12.9	19.22	16.01	83.27

Great care to observe the proper methods of cultivation was taken on the O. E. Farm. As a result, the percentage of sugar in juice, and purity of juice, are much higher than the average throughout Ontario. One cause of this marked difference, is the pains taken on the O. E. Farm to grow the roots entirely under ground and close enough together.

The analysis of this year's product sustains the conclusion of former analyses, that the percentage of sugar in Ontario would, under proper cultivation, be as high as in Europe. In support of this conclusion, there was a three years' average of 16.01 per cent. sugar in juice, with a purity of 83.27 in the O. E. Farm product, grown under proper cultivation; and the Ontario average was 13.53 per cent. in 1891, against 13.58 per cent. in 1890, of sugar in juice, with 80.35 in 1891 against 79.32 in 1890, purity.

In regard to the yield per acre, there is the same difficulty in obtaining reliable data as previously experienced. Calculations from one or two rows are not satisfactory. The Ontario Experimental Farm average of 19.9 tons per acre may be quoted as a possibility. The sugar average for Ontario is practically the same as that of last year. But the O.E. Farm product records a remarkable average of 16.01 as the result of three years' experience. The lower average for the province is due chiefly to non-compliance with some of the conditions of cultivation indicated by large beets, and the great amount of green matter on many of the samples received.

My report as above given includes only the latter portion of the year, commencing October 1st, 1891, the date on which I entered upon my duties in the College.

According to agreement, I visited, during the summer months, several of the leading experiment stations in the States, and took the six weeks' course in Organic Chemistry at Harvard University. Because of the inspiration, enthusiasm and direct assistance gained by visiting foreign experiment stations and spending a few weeks in some of the laboratories, I beg to ask that, if possible, provision be made, for the next year or two, so that I may attend one or more of those institutions during the summer.

Since the appointment of an assistant, I have been able to give constant attention to my classes; the analytical work has been properly attended to; and the laboratory has been clean and in good order at all times.

Very respectfully yours,

A. E. SHUTTLEWORTH,
Professor of Chemistry.

THE following table contains a detailed report of the 32 samples from which the above
Walkerville,

No.	Grower.	Size of plot.	Kind of soil.	When manured.	Date of seeding.	Distance between rows.	Distance between plants.	Date of thinning.
					May	in.	in.	June
1	G. Strohm, Dunnville	½ ac.	Sandy loam	1891	15	20	6	5
2	Rathbun Co., Deseronto	8¼ yd.	“ “	1890	30	24	8	15
3	“ “	1¼ ac.	“ “	1891	13	30	8	30
4	R. G. Hicks, Dunnville	⅛ “	Sandy	1891	7	30	8	....
5	D. McKinnon, Stratford	1/40 “	Sandy loam	1890	18	24	8	30
6	S. Furse, Goderich	1/10 “	Black loam	1891	20	33	10	.....
7	A. Buchanan, Goderich	....	Sandy loam	1891	6	33	8	22
8	Wm. Gould, “	1/28 ac.	Mucky	....	10	30	12	1
9	A. C. Huycke, Hastings	....	Clay loam	1890	10	18	9	.....
10	J. Stephenson, “	1/48 ac.	....	1890	31	24	6	20
11	S. Beamish, “	⅛ “	Clay loam	1890	4	18	6	10
12	G. Coleman, Oshawa	⅓ “	Sandy loam	....	23	24	.....	.....
13	J. Linton, “	⅛ “	“ “	....	26	18	8	......
14	W. H. Conant, “	⅛ “	Sandy	....	25	30	12	......
15	D. Pickel, “	⅛ “	Sandy loam	...	22	18	8	....
16	D. Hinkson, “	¼ “	Clay loam	1891	......	30	12	......
17	L. J. Coryell, “	1/15 “	“ “	1889	30	24	8	....
18	J. Drope, Harwood	¼ “	“ “	....	18	19	10	.....
19	W. J. Westington, Harwood	¼ “	“ “	....	20	18	8	......
20	J. Kennedy, “	¼ “	“ “	1891	20	18	7	.....
21	J. Murney, “	....	“ “	....	20	18	7	.....
22	G. Farr, “	¼ ac.	“ “	....	15	18	6	....
23	W. McKinlay, Plainville	¼ “	“ “	1890	24	18	8	....
24	Jas. Russell, Cobourg	⅛ “	Clay	...	15	24	9	..
25	D. Kennedy, Peterboro'	⅓ “	Clay loam	1890	15	22	9	30
26	“ “	½ “	“ “	1890	15	22	9	30
27	Geo. North, Marden	¼ “	“ “	1890	18	30	7	25
28	O. E. Farm, Guelph	1 “	“ “	1890	15	20	7	.....
29	O. E. F. (Silesian beets)	1/235 “	“ “	1890	23	24	11	30
30	O. E. F. (White French)	1/235 “	“ “	1890	23	24	11	30
31	O. E. F. (German)	1/235 “	“ “	1890	23	24	11	30
32	O. E. F. (Vilmorin Imp.)	1/235 “	“ “	1890	23	24	11	30
33	J. W. Taylor, Walkerville	1¼ “	Loam	1889	6	30	8	15
34	W. J. Lounsbrough, Walkerville	¾ “	Sandy loam	...	13	30	8	15
35	W. Hamilton, Dunnville	1/10 “	Sand	1889	30	18	5	20
36	W. Rutherford, S. Monaghan	....	....	....	......	....	.....	.....

NOTE.—All of the above had been fertilised with farmyard manure with the follow-
and 26 a mixture of farmyard manure, ashes and salt ; No. 33 received liquid manure

averages were obtained; and also less reliable data regarding the samples received from Dunnville and Monaghan.

Number of hoeings.	Number of scufflings.	Above ground.	Estimated yield per acre.	Average weight of beets.		Analysis of juice.			General appearance, etc.	No.
						Solids.	Sugar.	Purity.		
		in.	Tons.	lb.	oz.					
3	3	¾	48	2	5	17.8	15.78	88.6	Sharply tapering, regular	1
2	2	....	37.4	3	1	19.3	16.38	84.8	Regular, clear, fine	2
2	2	....	22.5	3	8	18.1	16.56	91.4	Short, irregular in shape	3
2	5	....	.....	3	0	13.8	9 79	70.9	Short, large and rough	4
2	2	....	......	3	0	16.3	12.60	77.2	Large, regular, little green top, drouthy	5
2	2	....	11.0	2	11	14.3	10.60	74.1	Turnip-shaped, smooth, no green	6
2	3	....	......	2	1	15.5	13.10	84.5	Regular, affected by drouth and grub.	7
3	2	2	21.0	2	12	15.9	11.40	71.7	Large, irregular, rooty, drouthy	8
2	3	4	.....	2	0	13.6	10.20	75.0	Varying, short, tapering, drouthy	9
2	2	1	6.0	2	9	16.1	12.0	74.5	Some very large	10
4	4	....	20.0	3	5	16.1	12.4	77.0	Very large and green top	11
4	4	....	15 0	2	14	16.3	13.4	82.2	Rough, rooty	12
4	4	....	14.4	1	1	17.3	14.4	83.2	Tapering, clear skinned	13
2	2	....	14.8	2	7	13.3	8.5	63.9	Short, rough, very green on top	14
4	4	....	12.0	3	1	19.3	15.7	81.3	Large, turnip-shaped	15
3	3	2	18.0	2	3	19.3	15.8	81.8	Varied, rooty	16
2	2	1	5.0	2	5	15.9	11.3	71.0	Varied	17
2	2	...	15.6	1	12	14.4	12.2	84.7	Good shape, tough	18
2	2	....	12.0	1	6	16.9	15.4	91.1	Small, long, pointed, good	19
2	2	....	12.0	1	9	16.5	14.0	84.8	Regular, some green top	20
3	4	....	....	2	5	16.9	13.2	78.1	Medium, long, pointed	21
2	2	....	14.4	1	2	19.7	16.3	82.7	Small, clean, good	22
2	2	....	13.2	1	4	14.4	12.1	84.0	Clear, tough	23
3	3	....	. ..	2	1	16.0	11.3	70.6	Short, tough, very green in top.	24
2	2	..	14.0	1	14	20.6	17.1	83.0	Rough, rooty	25
2	2	....	14.5	2	8	16 0	13.1	81.8	Varied, smooth	26
2	3	....	6.0	1	5	16.1	13.7	85.0	Dull-skinned, green top	27
5	....	....	19.02	1	0	16.6	14.2	85.5	Good shape, clear	28
4	5	....	20 6	2	4	16.8	13 6	80.9	Long, even, clear-skinned	29
4	5	....	16.90	1	7	18.6	15.7	84.4	Small, tapering, rooty	30
4	5	....	20.7	1	13	18.9	15.3	80.9	Varied, irregular	31
4	5	....	21.3	1	13	19.7	15.9	80.7	Rough, rooty	32
3	1	...	21.3	1	12	16.1	9.9	61.4	Medium, fair, wilted	33
2	2	1	22.0	1	9	21.4	17.0	79.4	Small, short, wilted	34
2	2	...	40.0	1	8	22.4	18.2	81.2	Small, stubby	35
....	....	....	......	1	14	14.9	10.0	67.7	Regular, very green top	36

ing exceptions: No. 3 received a mixture of farmyard manure and wood ashes; Nos. 2 and Nos. 8 and 34 had never been manured, being on new land.

REPORT BY C. C. JAMES, M.A., FORMERLY PROFESSOR OF CHEMISTRY.

Previous to the appointment of Prof. Shuttleworth (whose report has just been given), two bulletins were issued from the department of chemistry, and a large amount of work done in the analysis of samples of milk and butter. The results of the dairy analyses are given by Prof. Dean, in his report upon the work done in the dairy department (Part VIII. of this volume). The two bulletins are given below:

DETERMINATION OF FAT IN MILK (BABCOCK'S CENTRIFUGAL METHOD).

Methods have been suggested, from time to time, for the rapid determination of fat in milk, useful, not simply in the chemical laboratory, but also in the creamery, the cheese factory and the dairy. Some of these have been modified and improved, most of them rejected as impracticable. Any method suitable to the demands of analysts and dairymen must meet at least four requirements, viz.:

1. It must be rapid in its work and in giving results.
2. It must be comparatively easy of manipulation.
3. It must not be very expensive.
4. It must be accurate and reliable.

After a thorough test, in which the results have been verified by thorough gravimetric analysis, we have concluded that the method devised by Dr. S. M. Babcock, chemist of the Wisconsin Experiment Station, most nearly fulfils the above four requirements. His method was given to the public in Wisconsin bulletin No. 24, 1890, entitled "A new method for the estimation of fat in milk, especially adapted to creameries and cheese-factories."

METHOD OF ANALYSIS.—Small glass bottles are provided in which the milk is to be tested. These are seven inches high, carrying a graduated neck four inches long, and one-quarter inch internal diameter. As the accuracy depends primarily upon the correct graduation of these bottles, they should be purchased only from reliable firms that guarantee their correctness. Equal volumes (17.5 cubic centimetres) of milk and strong commercial sulphuric acid or oil of vitriol are mixed in these test bottles. The effect is that the casein is dissolved and a rim of yellowish oil begins to form on the dark purple-colored solution. The test bottles are then placed in a whirling machine and while kept warm by hot water or steam, the centrifugal motion forces the heavy acid to the bottom and the light oil to the top. Warm water is added and the melted oil slowly rises into the neck, the amount read by the graduations giving the percentage of butter fat in the milk. Machines may be obtained that will carry from four to sixty bottles at one time.

I shall now criticise the method under the four requirements before stated.

1. RAPIDITY. According to Dr. Babcock's published instructions the milk is measured into the bottles by a glass tube, the acid added measured by a small graduated glass; then they are whirled for five minutes, warm water added to each bottle, again whirled for one minute, readings taken, bottles emptied and rinsed. The amount of time required depends of course upon the number of analyses made; one whirling will do for sixty as well as for four, so that the time is principally consumed in measuring the milk and acid and in adding the warm water. After using an apparatus for some time we find that the whole operation for ten samples requires about half an hour. Taking a hint from the practice of the chemist of the Vermont Experiment Station, we have found that in our case the following method has shortened the time required and lightened the labor; 25 cubic centimetres of milk are run into the bottle, then about three cubic centimetres of a solution of amyl alcohol and common muriatic acid (equal parts); then the bottle is filled to the neck with strong sulphuric acid from a burette, placed in the machine with-

out any hot water or steam, whirled for one minute, filled with warm water or acid to bring the fat into the graduated neck and the readings at once taken, seven-tenths of which gives the correct percentage of fat in the milk.

2. Ease of Manipulation. The instructions are quite simple, and present no great difficulty. The acid must be handled carefully, as it rapidly chars wood and burns clothes and fingers. The sampling must be done carefully and conscientiously. A little natural knack or dexterity in work will greatly assist in the carrying on of the testing, but I can see no reason why a person of ordinary intelligence by carefully following the instructions should not have success in every determination.

3. Cost or Expense. The first cost is the principal cost, apart from the time of the person who makes the determinations. If care is exercised no bottles need be broken. Beyond that, the acid is the only material or agent absolutely demanded. This costs from one cent to one-quarter cent per test, according to the quantity of acid procured. If the solution of amyl alcohol and muriatic acid is used, the cost will be slightly increased (by about six to ten cents for every hundred tests.)

The first cost of the complete outfit may be gathered from the following three sets of catalogue prices :—

Machines made by Cornish, Curtis & Greene, of Fort Atkinson, Wis., for which John S. Pearce & Co., of London, are Ontario agents.

4 bottle test machine	$14 00
10 " " "	20 00
15 " " "	22 00
20 " " "	25 00
30 " " "	29 00

The Beimling machine, used by the Vermont Experiment Station, handled by the Creamery Package Manufacturing Co., 20 N. Clark St., Chicago, Ill.

3 bottle test machine	$20 00
6 " " "	25 00
12 " " "	32 00
24 " " "	50 00

Machines made by D. H. Roe & Co., 54 North Clinton St., Chicago, Ill.

4 bottle test machine	$8 00
8 " " "	10 00
12 " " "	14 00
24 " " "	20 00
30 " " "	40 00
60 " " "	50 00

I understand that some other United States dealers are handling machines, but we have not seen their prices. Our Canadian dairy supply companies should be in a position either to manufacture or to handle for this province some of these machines.

The prices given by J. S. Pearce are Canadian prices, whereas the others are United States prices. Whether to get the Canadian prices for the other Chicago machines it will be necessary to add 30 per cent. for duty or not I cannot definitely say, as these machines may perhaps be sold to Canadians at lower rates than those catalogued in order to meet the duty in whole or in part.

4. Accuracy of Results. The first experiment made by us was to test the agreement of the bottles with one another. They read as follows on a sample of milk :

Seven bottles gave	2.7 per cent. fat.
Three " "	2.8 " "

A gravimetric analysis made in duplicate by the asbestos method gave us for the same milk 2.65 and 2.68 per cent. fat. We have since tested the bottles and also those of the Beimling machine, as follows :

All bottles	G., C. & G. machine	3.36	per cent.	fat.
	Beimling machine	3.31	"	"

An advantage of this method is that sour milk can be handled quite easily. We tested a sample of milk fresh and then again after two days' standing.

Fresh milk by machine gave	3.6	per cent.	fat.
Same milk very sour gave	3.6	"	"

For the analysis of skim milk and buttermilk, bottles can be obtained that give more delicate readings. We made four comparisons on different days with different milks between this rapid method and the gravimetric method (in duplicate) as follows:

(*a*)	Rapid centrifugal	2.7	per cent.	fat.
	Gravimetric (asbestos method)	2.67	"	"
(*b*)	Rapid centrifugal	3.6	"	"
	Gravimetric (asbestos method)	3.65	"	"
(*c*)	Rapid centrifugal	4 3	"	"
	Gravimetric (asbestos method)	4.2	"	"
(*d*)	Rapid centrifugal	3.85	"	"
	Gravimetric (Adam's paper method)	3.74	"	"

If the bottles are accurately graduated and the instructions are followed, I consider the method exceedingly satisfactory. It is especially useful in experimental work, in chemical laboratories, milk inspection in cities, and in connection with dairies, creameries and cheese factories. It has enabled us to accomplish a larger amount of analytical work than ever before, and is in daily use in our laboratory. Anyone desirous of seeing the machines, their method of work, and of judging for themselves as to whether their use is practicable in their work, will be welcome at the chemical and dairy departments of this institution. Their use by city health officers and food inspectors, by enterprising breeders of dairy cattle, and in experimental work where every pail of milk is to be analysed is to be strongly commended. With large creameries and cheese-factories the whole question turns on the amount of time required for the work, or the number of analyses to be made each week.

In conclusion I append, as showing the use to which the machine can be put, the average of one week's analyses of milk from six ordinary cows fed for experimental purposes :

Cow.	Average for one week of—	
	Morning milk.	Evening milk.
No. 1	3.25	3.96
No. 2	2.76	4.00
No. 3	3.18	4.38
No. 4	3.42	4.45
No. 5	2.75	4.18
No. 6	2.63	3.70

EFFECTS OF PITTING ON SUGAR BEETS FOR SUGAR MANUFACTURE AND FOR FEEDING.

The report upon our investigations in regard to the growing of sugar beets for sugar production has been given in the lately published report of the Ontario Agricultural College and Experimental Farm for 1890, pp. 66 to 75 and 96 to 98, to which the attention of the reader is directed in connection with this bulletin.

PRESERVATION OF BEETS. The preservation of the sugar beet between the time of its removal from the ground until it can be worked over in the factory will be a matter of very great importance in this province where the winters are severe and sometimes quite changeable. When the growth of the beet has stopped and the products of the leaves have been transferred to the root, the beet is said to be "ripe," and is ready to be harvested. The signs of this condition in the leaves are the color and the drooping of the leaves; the color changes to a yellowish green and the outer leaves droop or wither and fall as though showing that their season is done. If the beets are to be taken straight to the factory the green heads or collars as well as the leaves may be cut off and left upon the field, but if they must be preserved for some time it is customary not to cut them down too much.

In the preservation of the beets, whether in cellar or in pit, four conditions are to be avoided, viz., excessive cold, as freezing and thawing inverts the sugar and causes loss in the factory; excessive heat, as the resulting growth uses up sugar rapidly; excessive moisture inducing decay; and excessive dryness causing a withering. The conditions, therefore, are moderate and the aim is to preserve the beet in about the same condition in which it is as it comes from the ground before frost.

EARTH PITS. The earth pit or silo is most extensively used in Europe where the preservation in winter is as great a difficulty as with us in Ontario. These pits may be temporary and simple in construction or they may be permanent, well paved and walled. They are about six feet deep, ten feet wide, and as long as the extent of the crop demands. A small ditch down the centre of the pit permits the excess of water to escape and a free circulation of air is allowed by having an open floor of poles and a ventilating shaft through the centre. The beets, culled and sorted, are then carefully piled in, a sloping roof-shaped heap formed by them above ground, and then they are covered with earth. The depth of earth required in this province and the advisability of using straw between the beets and the earth will be matters of experiment for the future. The depth will, no doubt, be largely controlled by the severity of the weather.

OUR EXPERIMENT. The sugar beets grown at this farm in 1890 were placed in a pit or silo by Prof. Shaw, and the pit was opened on March 12th, 1891 (about the end of the sugar making season), for the purpose of examining the beets and of obtaining samples for analysis. Shortly afterwards the beets were fed to the stock. In general appearance the beets seemed about as when first pitted, except that sprouting had taken place in some. The loss in sugar amounting to a little over two per cent. would seem to indicate that they would have turned out a little better, for the producer at least, if they had been topped a little closer. The loss of sugar in the silo should not much exceed one per cent. At the same time the beets analysed weighed over one pound, a fraction more than the average taken last fall, whereas to get results fairly comparable, they should have weighed a little under one pound. The beets taken out were analysed in three lots. I give the results and also the average of 53 beets analysed by Mr. W. Skaife and myself of the freshly harvested beets, omitting however the larger beets from the outside row. Allowing for any errors in sampling we can safely conclude that the beets lost about two per cent. of sugar in the silo, that the co-efficient of purity, however, remains about as before, and that the beets even after being preserved five months in a simple earth silo came out in a condition very favorable to the production of sugar. There seems to be no doubt that in this province the sugar beet can be preserved as long as necessary through our winter months in a condition suitable for sugar making.

ANALYSIS OF PITTED SUGAR BEETS.

No of beets taken.	Weight lb. oz	Analysis of juice.			Remarks.
		Solids	Sugar	Purity.	
4	4 0	15.00	12.58	83.86	Slightly Sprouted.
4	5 0	16.00	13.02	81.38	Grown above ground.
4	4 10	14.76	12.01	81.37	Well grown, fair.
Average after pitting	1 2	15.26	12.54	82.20	
Average before pitting	1 1	18.02	14.77	81.97	

SUGAR BEETS AS FODDER. In many parts of Ontario sugar beets have for years past been grown for stock feeding, and the acreage will this year probably far exceed that of former years, as in some districts extensive experiments are being carried out to determine the practicability of beet sugar production. The farmer in these circumstances always has the second string to his bow, if he cannot find a factory for his beets he can feed them to his stock. With the view of determining their value in stock feeding in comparison with other roots we have analysed sugar beets from the pit and turnips and mangels from the farm root cellars, all of them taken about the end of March The value of roots in a ration consists principally in their high percentage of carbohydrates (starch and sugar). By their water they offset the dryness of hay, straw and grain. They are usually quite palatable and appetising and have a toning up effect upon animals that is not brought out in a chemical analysis or statement. I give the next analyses of these three roots, stating first their composition, dry or water free, and below that as fed :

—	Water.	Crude protein.	Crude fat.	Carbo hydrates.	Crude fibre.	Ash.
1. Dry.						
Sugar beets	....	9.03	0.67	80.39	6.09	3.82
Turnips	.....	11.89	1.35	73.73	8 57	4.46
Mangels	.....	17.69	0.91	67.98	6.44	6.98
2. As fed.						
Sugar beets	82.93	1.51	0.11	13.73	1.04	0 65
Turnips	87 09	1.54	0.17	9.53	1.10	0.54
Mangels	91.00	1.59	0.08	6.12	0.58	0.62

The sugar beets contain far less water than the other roots and far more carbohydrates, and as the feeding value consists principally of sugar and starch, it will at once be seen how much more valuable pound for pound the sugar beets are than mangels or turnips. If we compare them on the basis of their value as heat and force producers (which is their principal use in a ration) the beets, turnips and mangels will have about the values of 4, 3 and 2 respectively. The great value of sugar beet for fodder, apart from their value as a source of sugar ought to be carefully considered by the farmers of this province. The use of sugar beets in feeding for milk production in preference to turnips need not be dwelt upon here. Another point to be observed is that the sugar beets most valuable for sugar making are also most valuable for feeding; the high percentage of sugar so profitable for the sugar factory is as much to be desired for feeding, and the use of "thoroughbred" seed and the practice of the best methods ought to be strongly emphasised. The same care used in the production of beets for the factory will pay in the raising of beets for fodder. Suppose we take an example—an acre of sugar beets is grown containing say 15 tons; one sample of medium sized beets last year gave us 11.5 per cent. sugar, while another sample, the best, of about the same size had 17.5 per cent. sugar. The former would contain about 3,280 lb. of sugar per acre, the latter would contain about 4,990 lb., an increase in value of over 50 per cent. above the former, whether for sugar making or for feeding, and as this sugar comes entirely from constituents found in the air and is not produced at the expense of the soil it follows that the growing of the best sugar beets, the richest in sugar and the purest in quality, is to be recommended.

1. Use only reliable seed, highly developed, sugar producing in its strain, imported fresh from the best French or German sources.

2. Grow beets of moderate size rather than too large, the moderate sized beets have more sugar and less water than the larger beets.

3. Keep them well covered all the season through, as sugar is found principally in the portion below ground.

CULTIVATION.

The closing paragraph in a late publication from the great French sugar beet firm, Vilmorin, Andrieux & Co., is so important in regard to the production of sugar beets for sugar purposes and for fodder, and is so authoritative that I take the opportunity of closing this bulletin with a translation of the same: "We cannot insist too much upon the necessity of choosing well and of preparing properly the land intended for the cultivation of sugar beets. It happens almost daily that the seeds and those who have furnished them are held responsible for failures and mistakes arising solely from the bad conditions under which the growth has taken place. Every one desires, and rightfully so, to obtain only beets that are long, clean, compact (without branching roots), but it must be considered that to be developed in this condition the beets must necessarily find a depth of earth sufficiently mellow to be produced there without hindrance; nothing promotes so surely the development of lateral roots as the prevention of the lengthening of the tap root owing to the hardness or poor quality of the sub-soil. It is the height of inconsistency to expect roots to be long, clean and under ground, and to refuse them the room absolutely necessary for their development. The food or manure ought to be carefully suited to the local circumstances; the multiplication of fields of experiment has contributed for some years past in furnishing more and more fully all the instructions necessary for this subject. The adoption of the best methods of growth is of great importance after the choice of the best varieties, for the *maximum* of produce, both in weight and in quality, can be obtained only from the best seeds well cultivated.

PART IV.

REPORT OF THE

PROFESSOR OF VETERINARY SCIENCE.

To the President of the Ontario Agricultural College :

Sir,—I have the honor to submit herewith my Annual Report for 1891

On account of the high price of oats last winter, some burnt wheat was purchased t a low price and mixed with barley and oats and ground. This was fed to the horses or their grain ration, and proved to be very unwholesome, for it resulted in a number of ases of intestinal indigestion, one of which was very serious, and another proved atal.

As soon as oats were substituted for the mixture containing wheat no further rouble was experienced. There is no doubt that wheat is the most indigestible of all rains for horses, and if used at all it should be in very small quantities, well ground nd thoroughly mixed with a gallon or two of cut hay or straw.

If there is any doubt about the restriction as to quantity being carried out, and the ation of which the wheat forms a part being carefully mixed with chaff, it is unsafe to se wheat at all for horses.

My opinion is that any quantity in excess of a pint at a meal is dangerous, and that when other grains are available it is well to avoid the use of wheat for horses in any quantity.

Death of a Steer.

A red steer that was being used for an experiment died of inflammation of the tomach (4th compartment) and bowels, which was very clearly shown by a *post mortem*.

There is no doubt that the food given acted as an irritant, hence the inflammatory action.

The animal's diet consisted of grain and silage, no bulky dry food such as hay or traw being allowed.

While the silage upon which he had been fed during the winter and spring lasted he emained perfectly healthy and was a beautifully fattened animal, and very thrifty ; but when, in the beginning of June, this source of supply became exhausted, and other silage was procured to complete the experiment the trouble arose.

The last silage that was used was very much sourer than that upon which he was mainly fed.

Had it not been necessary to make this change, I feel sure no injurious consequences would have arisen.

Prof. Shaw will doubtless explain this experiment and make deductions from it, so I shall say nothing further than that from a veterinary standpoint my experience is, that cattle show a wonderful tolerance of considerable quantities of sour silage, and in fact seem to thrive upon it.

A WEAK FOAL.

A well bred Clyde mare dropped a weak foal last spring, which soon began to show evidence of "Joint ill." It was treated and carefully nursed for a couple of weeks, but continued to fail rather than improve, until it was considered advisable to destroy it.

A CASE OF TUBERCULOSIS.

A nine year old Galloway cow, that had been laid up for some time with a severe strain of the fetlock joint, began to show signs of unthriftiness during last winter, In addition to unthriftiness and capricious appetite her respirations became more frequent, which latter symptom was better marked on exertion. On applying the ear to the side of the chest a well marked friction sound was audible, particularly on the left side. These symptoms gave rise to a very strong suspicion of tuberculosis being the trouble, so the animal was isolated for further observation. Her symptoms continued to increase in severity, until it was very evident that death was imminent, when she was slaughtered before the students and a post mortem held.

The deposits of tubercle were considerable throughout the lungs, as well as in the pleuræ, and covering of the heart, all the other organs being free from deposit.

SHEEP.

With regard to our old enemy the tape-worm in lambs, I have nothing to add to my report of last year, except to say that we had the same trouble this year.

The Minister of Agriculture has intimated to me that he purposes affording an opportunity of experimenting with some sheep, with the object of trying to unravel the mystery as to the propagation of this trouble and great source of loss.

Respectfully submittted,

F. C. GRENSIDE.

PART V.

REPORT OF THE FOREMAN

OF THE

HORTICULTURAL DEPARTMENT.

To the President of the Ontario Agricultural College:

Sir,—In your report for 1890 you gave a very efficient outline of the horticultural department; what it contains and the progress being made. This, supplemented by various bulletins issued by Prof. Panton on instructive work, covers, I think, very effectually the work of this department. During the past year no new work of importance has been undertaken, with the exception of a few experiments in the application of insecticides and fungicides, chiefly in the line of what we have seen recommended in previous bulletins for the prevention of plum curculio, codling moth, tent caterpillar, bark lice, apple scab, and mildew on gooseberries; all of which we have suffered from to some extent. Although the tests so far seem encouraging, it would be premature to draw conclusions from the trials made in one season, as the ravages of all those pests are much more excessive some years than others. The past season has been on the whole very favorable to plant growth. The months of May and June were unusually dry, and, consequently, late sown seeds germinated slowly—in some cases not at all—yet the crops generally were above the average, with the exception of apples, which were about half a crop. Grapes were a fair crop, but on account of the early fall frosts which we usually get in this locality only about half the crop ripened sufficiently to be cut for use. Our young orchard looks promising, and the small fruits, raspberries, currants and gooseberries, have done extra well, and all the requirements of the Colleges in that line were fully supplied. The kitchen garden, as usual, has produced in abundance all the culinary vegetables in their season required by the College boarding house, unless during the spring months, when there has always been a demand for early vegetables, which for lack of accommodation we have hitherto been unable to meet; but we trust that from the new buildings now under way this much felt want will at least to some extent be supplied.

The new greenhouses now under construction have been much needed for years, and we are now pleased to see them so far advanced, but had they been finished last September, instead of next February or March, as it seemingly will be, some plants of considerable value might have been saved, and nearly a year gained in furnishing the houses. Our collection of plants is very limited and consists chiefly of the soft wooded class, no money having ever been spent to procure a better collection. We might have propagated to any extent the stock of plants that we have, but now, with the near prospects of increased space and better facilities for growing exotic plants, I trust you will endeavor to obtain, from those who have the power to grant, an appropriation for procuring a collection of plants representative of economic or commercial interests, which would be alike interesting to the students, and creditable to the institution and province.

The following garden produce was supplied to the College during the year :

Garden produce.	January.	February.	March.	April.	May.	June.	July.	August.	September	October.	November.	December.	Total for the year.
	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.
Apples........	......	......	......	......	......	......	......	1 25	3 00	12 50	......	......	16 75
Asparagus......	......	......	......	......	28 80	36 40	......	......	......	......	......	......	65 20
Beans.........	......	......	......	......	......	......	3 20	1 60	48	......	......	......	5 28
Beets	18	45	15	15	18	......	62	15	......	37	......	13	2 38
Cabbages......	3 25	7 20	5 52	1 30	......	......	1 50	2 47	1 40	2 20	2 00	1 80	28 64
Carrots	75	60	60	60	25	......	1 05	20	20	44	90	......	5 59
Cauliflowers....	......	......	......	......	......	......	......	9 75	4 20	3 30	......	......	17 25
Celery.........	8 70	10 80	8 10	......	......	......	......	50	2 50	1 80	1 00	8 50	41 90
Citrons........	......	......	......	......	......	......	......	......	......	7 50	......	......	7 50
Corn..........	......	......	......	......	......	......	......	2 00	4 72	2 00	......	......	8 72
Cucumbers.....	......	......	......	......	......	......	34	19 00	8 65	......	......	......	27 99
Currants	......	......	......	......	......	......	20 34	......	......	......	......	......	20 34
Gooseberries....	......	......	......	......	......	4 80	17 6	......	......	......	......	......	22 26
Grapes........	......	......	......	......	......	......	......	......	35 16	......	......	......	35 16
Herbs..........	80	70	30	15	10	85	25	25	......	45	30	45	4 60
Lettuce........	......	......	......	1 95	3 50	4 60	40	......	......	......	......	......	10 45
Onions.........	2 25	3 00	2 63	2 62	......	95	15	15	25	1 38	1 50	2 50	17 38
Parsnips.......	1 80	1 50	2 93	2 36	2 13	50	......	......	......	1 75	1 75	87	15 59
Peas...........	......	......	......	......	......	1 50	7 00	2 50	......	......	......	......	11 00
Potatoes.......	......	......	......	......	......	......	12 37	15 05	3 40	52 15	......	......	82 97
Raspberries	......	......	......	......	......	......	42 49	16 73	......	......	......	......	59 22
Rhubarb........	......	......	......	......	7 20	6 00	63	2 20	......	......	......	......	16 03
Spinach........	......	......	......	......	......	3 80	3 20	......	......	......	......	......	7 00
Squash	......	......	......	......	......	......	......	......	......	18 00	......	......	18 00
Strawberries....	......	......	......	......	......	1 47	3 54	......	......	......	......	......	5 01
Tomatoes	......	......	......	......	......	......	25	5 00	11 12	6 50	......	......	22 87
Turnips........	85	1 55	1 80	1 35	1 30	......	......	......	......	80	1 00	60	9 25
Sundries	50	25	2 50	......	20	18	18	30	56	1 52	50	1 00	7 69
Totals......	19 08	26 05	24 53	10 48	43 66	61 05	114 97	79 10	75 64	112 66	8 95	15 85	592 02

The surplus produce above College supplies was sold for $83.35.

Your obedient servant,
JAMES FORSYTH.

Ontario Agricultural College,
December 31st, 1891.

PART VI.

REPORT OF THE PHYSICIAN.

To the Honorable John Dryden, Minister of Agriculture :

SIR,—I have the honor of presenting to you the following brief report :

During the year we have had just such diseases as are usual in this locality, occasionally interspersed by "la grippe," accompanied by or followed by well marked respiratory symptoms of the lungs or bronchial tubes.

Only one accident of a serious nature has occurred this year. One of the laundry maids was so unfortunate as to allow her hand to be drawn between the rollers of the mangle, and the hand was so badly burned that when the slough was entirely removed portions of the bones of the hand, including those of two fingers, were exposed to view. I am glad, however, to report that through the persistent efforts of the Matron to carry out my instructions the hand has healed with but slight deformity.

The College is in good sanitary condition.

I now have the pleasure of reporting the completion of our neat little hospital with all its comforts for the benefit of the sick. It has done us good service already.

I have the honor to be, Sir,
Your most obedient servant,
E. W. McGUIRE,
College Physician.

December 31, 1891.

PART VII.

REPORT OF

THE PROFESSOR OF AGRICULTURE

AND FARM SUPERINTENDENT.

ONTARIO AGRICULTURAL COLLEGE, EXPERIMENT STATION,
31st December, 1891.

To the President:

SIR,—I have the honor of herewith submitting my report for the year 1891 for the respective departments of this institution under my own immediate supervision. These include, in addition to my own report proper, a joint report of experimental work by Mr. C. A. Zavitz, B.S.A., assistant in the experimental department, and myself; the report of Mr. J. E. Storey, the farm foreman, and also that of Mr. James McIntosh, foreman in the mechanical department.

The past year has been successful beyond all precedent in the history of the farm, and this applies both to the good crops that have been grown and also to the extent of the work undertaken in the experimental departments and the measure of success attending this work. The season, which was rather dry at its commencement, was ominous of failure during the spring months; but the weather during the summer months was unexceptionable. It was particularly favorable to the filling of the grain in the ear, hence the good yield obtained from the cereal crops. The hay crop so deficient in many places was nearly an average one with us. The grain crops were all good except the peas in the small plots; the roots were excellent; the rye and rape both gave good returns, and the 50 acres of winter rye and wheat now in the soil are looking very fine. In all this there is abundant reason for thankfulness to the Giver of all good.

The following is a summary of the principal items treated of in the report:

I.—IMPROVEMENTS MADE DURING THE YEAR.—1. The improvement of roads. 2. The erection of fences. 3. Fitting up the experimental sheep barn. 4. The sinking of wells. 5. The destruction of weeds.

II.—SPECIAL CROPS GROWN UPON THE FARM.—1. Sugar beets. 2. Rye and rape. 3. Catch crops.

III.—THE LIVE STOCK OF THE FARM.—1. Horses. 2. Cattle. 3. Sheep. 4. Swine.

IV.—MISCELLANEOUS ITEMS.—1. The exhibits made. 2. The sale of live stock. 3. The sale of grain and potatoes. 4. Visitors during the year.

I.—IMPROVEMENTS MADE DURING THE YEAR.

1. The Improvement of Roads.

Reference was made in the report of 1890, p. 90, to the progress which had been made in the improvement of the Brock road in front of the College. The gravelling of the road had just been completed when the winter set in. In the spring the sides were properly levelled from the ditches to the head ridges of the bordering fields. Grass seeds of various kinds were then sown over the whole width of the road except the gravelled portion. The dry weather of spring caused a partial failure in the catch of the seed and this gave some trouble from the growth of weeds, but these were well kept under by the use of the field mower principally. When the borders of roads are so levelled that the field mower can be used upon them they may then be kept clean at a minimum of cost. The gravel put on this road last autumn has stood well the wear and tear of the heavy and constant traffic going over it, and the regular slope given to the road from the centre to the sides has kept it dry throughout the year.

The private road leading past the barns was gravelled in part during the winter. The gravel put upon this road covers a space of 11 feet. Situated as we are for labor, the winter does not seem the most suitable time for gravelling roads. Our students work only in the afternoon. We found that during the interval when the labor was not going on the frost penetrated into the gravel sometimes to the depth of from six to nine inches. I conclude therefore that in this climate gravel can only be drawn profitably in winter when the work is done rapidly, and with as little interruption as possible, and when the weather is not severe.

2. The Erection of Fences.

The new fences erected during the year were chiefly along the private road leading to the barns, and also along the Brock road referred to in the previous sub division. The fence along the sides of the private road extends from the Brock road to beyond the farm out-buildings. It is placed just outside the shallow ditches bordering the road and is designed to protect the borders of the road and the trees planted thereon for a term of years. The details relating to the construction of this fence are given in the report for 1890, p. 91.

The fence erected along the Brock road extends from end to end along the whole of one side across the farm and along one-half of the opposite side. The fence in front of the College grounds was not disturbed. There were thus 240 rods erected along this road. The style of this fence and the mode of constructing it are described in the report of the foreman of the mechanical department. I would only add to that description: 1. That the height of the fence is 4 feet, 2 inches, which is ample for ordinary uses; any increase in height would probably detract from the good appearance. 2. That the lower rail should be 2x6 inches as well as the top one. The wire when stretched sometimes draws the bottom rail upward in the centre of the space. 3. That under this fence the ground is quite level, which, considering all things, is probably preferable to any kind of ridge that may be made.

3. Fitting up the Experimental Sheep Barn.

This barn was moved from the south private road, where it had stood for many years, into the yard enclosure belonging to the dairy barns As stated in the report of 1890, p. 93, this barn is to be devoted to several uses, but it will be chiefly used for the experimental feeding of sheep and lambs in winter. The building is 27x76 feet. A ground floor was put into it by the students after the opening of the College, October, 1891. This floor was made by laying small stones on the earth to the depth of several inches and covering them with sand. The shed is divided into four compartments; the divisions are made by double racks which run across the building. The racks have movable divisions running through the middle along their entire length so that the fodder given to lots of sheep feeding on opposite sides of the rack will not mix. Low doors open from each compartment into yards in front. The hay and other fodder is kept overhead, and likewise the grain. The fodder comes down through shoots, and the grain is drawn from spouts which come down into the lower compartments. A root house is wanted near at hand to complete the arrangements. The barn has capacity for feeding 100 animals.

4. The Sinking of Wells.

Two wells were sunk during the year, one of them near the north corner of field No. 20. In the corner of this field are probably 10 acres of rugged pasture which in some portions of the year is marshy in some parts. It has never been brought into subjection to the plow, nor can it be with profit until it is drained. To drain it would entail large expense as the outlet goes through other property. The movement of the water is so slow, even in times of excessive rainfall, that it is not easy to notice which way the current moves. Heretofore this field was practically lost to the farm, as during the summer and autumn, the only seasons when the low parts were dry enough to be pastured, there was usually an entire absence of water. Prior to 1890 this field was a favorite abode for the Canada thistle and many other weeds. The cost of sinking this well was only $23.25, as it only required to be sunk to the depth of 19 feet to give a never-failing supply of water. This outlay would be almost if not quite returned in one year by the value of the land if rented. The other well was sunk where the private road running northward now terminates. It was dug to the depth of 40 feet before an ample supply of water was obtained and cost $66.25. Both wells were stoned. The last mentioned well may be made to provide water for three fields of the farm.

5. The Destruction of Weeds.

Weeds are one of the great hindrances to successful agriculture; they are a source of constant annoyance and of destruction of capital. Every farmer has some method or methods of combatting them. It may therefore be interesting to describe the methods whereby the writer has endeavored to check the growth of and destroy weeds upon this farm since taking charge in 1888. The fields will be taken in order and a brief statement given of the method in each case.

Field No. 1 (20 acres). To get rid of thistles it was plowed out of sod in the autumn of 1889, and sown to rye. This was cut green the following spring for the silo, and the field was then sown with rape. The rape was pastured off. In 1891 the whole field which grew experimental grains was gone over in twelve hours by one person with the spud, and everything taken out that should not be there, including the fence borders as well.

Field No. 2 (20 acres). It grew hay in 1889. The most troublesome weeds were thistles, ox-eye daisy and wild flax. Cleaned by spudding.

Field No. 3 (16 acres). Principal weed was thistles. In 1889 a root crop was grown upon the larger portion of it. Since that time it has been kept clean by the use of the spud. The only part of it not entirely clean was an old experimental plot in one corner, which has still a few thistles.

Fields Nos. 4 and 5 (20 acres arable). The troublesome weeds were thistles and wild cockle. These fields were cleaned in 1890 with a root crop. The spud was used in 1891. A part of No. 4 is bush pasture. In 1889 the thistles were cut with the scythe, and they were growing in it in large numbers. In 1890 it was gone over twice with the spud, and the same in 1891. The first time of spudding this field in 1890 took fourteen hours of one person. The second time of doing this in 1891 took two hours.

Field No. 6 (20 acres). Here we found rag-weed, thistles, cockle and wildflax. As it has been mown for hay since 1888, some of the rag-weed seeds will probably be still in the ground, but none of the plants which have appeared have been allowed to bear seed. This has been effected through close pasturing in the autumn, and by the use of the spud. Thistles have also been handled in the same way.

Field No 7 (20 acres). This field was in meadow in 1889. Cockle, couch grass and thistles were found here. The spud reduced the thistles in 1889 and 1890, after the cutting of each hay crop. In 1891 a crop of corn was grown upon this field. Thorough and frequent cultivation was given in the dry spring of that year, up to the time of the planting of the corn. The corn was most carefully cultivated and the hand hoe was twice used. We are now of the opinion that the weeds, including the couch grass, are gone.

Field No 8 (20 acres). This field had a crop of roots in 1888. Owing to scarcity of labor in August and September of that year, it appears that this field did not get that completeness of cultivation requisite to destroy thistles, insomuch that it had a considerable sprinkling of them the following year. These have been cut twice a year with the spud since that time, and they are practically gone, along with the ox-eye daisies which grew in the same field.

Field No. 9 (20 acres). A crop of corn was grown in 1839, and the good cultivation it received left the field fairly clean of thistles. The spud has kept it so since.

Field No. 10 (14 acres).—In 1888 a crop of corn was grown. It was fairly clean in 1889, but some thistles grew here and there on it.; These have been almost completely eradicted since by the use of the spud. The spudding in this field after the hay had been removed in 1890, took eight hours of one man.

Field No 11 (20 acres). There were some thistles in 1889. In 1890 a crop of corn was grown upon it by the dairy department. The cultivation of this corn was not so complete as it should have been, owing to the low-lying nature of the ground and to the wetness of the season. It gave us some trouble with thistles in 1891, but the spud has more than kept them at bay.

Field No. 12 (20 acres). There were thistles, when in 1889 a crop of peas was grown. Wildflax appeared in winter wheat of 1890, some pigeon weed also. The root crop grown upon it in 1891 has completed the destruction of the weeds so well begun by the use of the spud, and by the autumn cultivation of the two previous years.

Field No. 13 (14 acres). It had been summer-fallowed in 1888, but the eradication of thistles by the process was by no means complete. The same may be said of wild cockle and to some extent of the wild flax. The spud has kept this field in a fairly clean condition since that time.

Field No. 14 (20 acres). This field has been largely devoted to experimental purposes and has been kept clean in that way. In the portion not so used the spud has virtually exterminated the thistles.

Field No. 15 (20 acres). This is a permanent pasture. In 1889 it had some thistles and ox-eye daisies. It was gone over with the spud twice in 1889, in 1890 and in 1891. The first spudding in 1889 took fully 100 hours of one person. The second spudding 80 hours. In 1890 the first spudding was done July 9th and 10th and took 40 hours. The second was done from August 26th to September 7th and took 32 hours. In 1891 the first spudding was done on July 18th and took 7 hours. The second was about the last days of September and took 6 hours. The cost, therefore, of cleaning this field, for it is now clean, was $22.50 in 1889, $9 in 1890 and $1.62½ in 1891, or a total for the three years of $33.12½ for the 20 acres. The labor is valued at $1.25 per day of 10 hours without board. It may be mentioned here that in one corner of this field the sheep and lambs bought for fattening on rape were hurdled that they might be trimmed and ear-tagged. This was in the autumn of 1890. During the summer of 1891 many forms of weed life sprang up there, including in largest numbers various forms of burs and and also burdocks. In this we find one explanation as to the way in which weeds are carried.

Field No. 16 (26 acres). This field had many thistles and other weeds in 1889. The crop of rye, which came after and the crop of rape which followed the rye the same season, practically exterminated them. In 1891 experimental grains in large plots grew in the same field. In the month of June of that year 17 hours of one person sufficed to remove all the bad forms of weed life in this field, in 23 hours with the spud, although it contains 26 acres. This spudding also included the fence corners.

Field No. 17 (17 acres). Canada thistle and the sow thistle were found here in 1889. In 1890 a hoed crop, followed by corn in one part and green fodder crops in the other in 1891 have practically cleaned the south-easterly half. A crop for green fodder in one portion and corn in another in 1890, followed by a crop of rye, succeeded by rape in 1891, has practically cleaned the other half, although some seeds of the sow thistle may still linger in the ground, and some couch grass still lingers along the fence border on one side.

Fietd No. 18 (13 acres). There were thistles in 1889. In 1890 it was fitted up for experimental grains. The only crop grown in it during that year was rape. The clean condition of this field was witnessed by the thousands of visitors who viewed the experimental grains which grew upon it in 1891.

Fields Nos. 19 and 20 (30 acres arable and 10 acres pasture). Thistles and wild mustard and other noxious pests came up here. The arable portion was thoroughly cleaned in 1891 by growing on it a handsome crop each of rye and rape. The thistles in the other part which is unbroken pasture were mowed in 1889, but the mowing seemed to effect no other good than to prevent them from going to seed. In 1890 this pasture was gone over but once with the spud. It took 45 hours of one man. In 1891 it was gone over twice. The first spudding took 25 hours, the second one 18 hours. In two other unbroken pastures the thistles were kept down by mowing in 1889 and 1890, but their numbers were not reduced by the process, so we took them in hand with the spud in 1891.

Field No. 21. Thistles grew here in the spring of 1889. Rape was grown upon it in the summer and autumn of that year in the north end, and in 1891 in the south end. There grew here wild mustard as well. It is now virtually clean. Burdocks were numerous in fence corners and the sides of stone heaps in the autumn of 1888. Since that time none have been allowed to go to seed. The seeds may yet linger in the ground, but they will all be got in due time when they grow.

This farm is now virtually clean, that is to say, it is sufficiently clean to grow seed grain upon it in any field thereof. It can never be said of any farm that it is absolutely clean, for weed seeds will be borne in upon it by birds and beasts, and wind and stream, but it is quite possible to render any farm practically clean. It is this stage that we feel we have reached.

The methods adopted in the cleaning process have been fairly well indicated in the facts given regarding the cleaning of the different fields. Something more should be said, however, in regard to the use of the spud. We have found it an invaluable aid in the cleaning process, but it is even more valuable as a means of keeping a farm clean when it has once been cleaned. It is the practice with us to go over the fields growing hay or pasture or sown to grass, twice a year, spud in hand. In the meadows the spudding is done in June, and it effects the destruction of such weeds as cockle, dock, wild flax, pigeon weed, the burdock and the ox-eye daisy. They are gone over a second time in August to destroy stray thistles, burdock, ragweed, and anything else which may try to grow and which is not wanted. The pastures are gone over twice after July 1st or 15th June at the soonest. The fence corners are mown early, and are then gone over twice with the spud. All bye places are gone over twice a year. The grain fields are gone over once in the month of June. They are then gang-plowed after harvest, unless rye is to be sown, in which case they are deeply plowed with the ordinary plow. The hoed crops do not, of course, require any spudding. The hand hoeing, if such is wanted, does the work there which the spud accomplishes elsewhere. By using the spud in this way farms that are once clean may be kept clean at a small annual outlay for spudding, the other general cultivation being good.

The question of the cost of cleaning this farm will doubtless be raised by the enquiring mind, and it is well that it should be. In reference to this, I desire to say that I am satisfied that the only outlay for which there was no direct return was that paid for hand spudding. The hoed crops would certainly all pay their way. On much of the land two crops were grown during the cleaning process. On the land gang-plowed after harvest, compensation for outlay is frequently obtained in catch crops grown. I regret that no account was kept in 1889 of the exact amount expended for spudding. In 1890 the time spent in spudding was 498½ hours of one person, which, at $1.25 per day of 10 hours, amounts to $63.31½. In 1891 the number of hours thus spent upon the farm, not including time spent upon the roads, was 489 hours, which would cost $61.12½. For the two years, then, the outlay for spudding was $124.44. This does not include spudding on the road. On the supposition that as much was expended in spudding in the year 1889 as in the two following years, and this estimate is certainly a liberal one, the whole outlay for spudding in three years would not be more than $250.00. Now, suppose that the 400 acres or thereabouts of arable land on this farm had been cleaned by the process of the bare fallow during these three years, that is one-third of it each year, the cost of hired labor of man and team, with rental of land added, in the absence of crop, would have been from $3,200 to $4,000. This calculation is based on the assumption that the cost of the bare fallow per acre, when all the labor is hired and the rental of the land included, would be fully $8.00 to $10.00 per acre.

It may not be amiss here to venture two or three remarks in reference to cleaning farms that are general in their nature. I desire to say first, that it is my firm conviction that the farmers of this province may have clean farms if they so desire it; second, that farms may be cleaned without great outlay, and ordinarily without resorting to the bare fallow process, and, third, that when thus cleaned the process of keeping them clean will not be difficult, providing due vigilance is exercised. When one field is cleaned it can easily be kept clean by the use of the spud and autumn cultivation, in addition to the cultivation necessary to the production of the crops grown. When thus cleaned, the hand spudding, essential in keeping fields clean of weeds, should not be more than $25 per year for 100 acres. We expect to keep this farm clean henceforth at an outlay of not more than $75.00 per annum over and above the ordinary process of good cultivation. This estimate includes private roads, fence borders, unbroken pastures and bye places.

When I say the farm is practically clean, I do not wish to be misunderstood. All weed life in its noxious forms is not gone, but weeds are so far under way that we expect to keep them well in hand in future for the annual outlay mentioned above. Weeds cannot easily be concealed in the month of June, and if any who may chance to read what has been said on this subject have any doubt as to the accuracy of the statements, they are cordially invited to make a personal examination during the month mentioned.

II.—SPECIAL CROPS GROWN UPON THE FARM.

The chief of the special crops grown upon the farm in 1891 were sugar beets, rye and rape and catch crops. The term *special* is applied to these crops here for the reason that they are not usually grown by the Ontario farmer, and they have all been grown by us in a sense for purposes of experiment. It is true that sugar beets have long been grown by farmers, but they have grown them mainly for feeding purposes, rather than to test the percentage of the sugar which they would furnish. Rye, too, has been grown all along as a cereal crop, but it has not been grown to any considerable extent on the lines of our present practice. Rape has also been grown for some years by a number of our farmers, but its growth has been confined until quite recently to a very limited number of them in but two or three counties.

1. Sugar Beets.

This crop is receiving more attention probably from the experiment stations of the United States than any other. It has been grown to a limited extent at this station for three years. Our object in growing it is to ascertain whether the farmers can grow sugar beets at a profit at the prices offered by those who are endeavoring to introduce the manufacture of beet sugar into this province. Longer time will be required before we can give a sufficient answer to the question, but we have added something this year to our stock of knowledge hitherto gleaned. We are able to say how much it cost us to grow one acre in 1891. The mode of preparing the ground and the methods of culture are given in the report of experimental department.

The following are the various items of cost :

Allowance for rental of land		$3 00
15 tons manure from yard at $1	$15 00	
Cost of drawing and spreading	5 50	
	$20 50	
40 per cent. of manuring charged against crops		8 20
Plowing and cultivating		2 50
Harrowing, rolling, drilling and sowing		1 50
15 hours cultivating, man and horse		3 00
Hand hoeing and weeding		8 00
Loosening with subsoil plow for pulling		50
Lifting and topping		4 50
Hauling and pitting		8 75
Total		$39 95

The analysis of the beets gave results as follows :

Solids in juice	16.6 per cent.
Purity of "	85.5 "
Sugar in "	14.2 "

Beets giving the above analysis are reckoned as worth $4 per ton. The crop of trimmed roots upon the acre was 18.22 tons. The value of these at the above figure is $72.88. The profit in this case to the grower is therefore $32.93. No allowance is made for seed which is furnished by the promoters of the industry.

2. Rye and Rape.

These two crops we have grown in conjunction for the past two years. The former has been grown for pasture, for fodder in winter and for ensilage. The latter has been grown almost entirely for pasture, but it has also been used to a limited extent for green fodder. These crops need not of necessity be grown in conjunction for such purposes, as most persons will know, but they are peculiarly suitable for being grown thus, owing to the different seasons of the year when they make the principal portion of their growth. By growing them in this way, two crops a year may be obtained without any difficulty. When the rape is grown in drills and thoroughly cultivated the land may be cleaned of the more troublesome forms of weeds as described in the Annual Report for 1890, pp. 94, 95, and it is also left in fairly good condition as to fertility for producing other crops that may come after.

We have not tested the value of rye to produce pasture to any great extent, but may do so in the near future. When fields are fairly free from weeds it should produce a large amount of pasture both autumn and spring when sown in the month of August. As a producer of fodder for winter uses we think highly of it. When cured in the shock, as described in the report of the Farm Foreman, we have found that it makes a good food when cut and fed with various combinations, such as corn stover, hay or straw, or a combination of these, some meal always being added. This year we obtained on an average fully two tons per acre on the 40 acres which we grew. In the absence of analysis we are unable to make a comparison between the value of the rye fodder and hay, but I repeat that when used as described above we think highly of it. And it is proper to mention that when the rye fodder is fed uncut the animals do not take kindly to it, especially at first, owing probably to its woody nature. Because of this not a few who have fed it in this way have too hastily come to the conclusion that rye fodder is possessed of but little feeding value.

As a crop for the silo we cannot as yet speak with sufficient definiteness as to its value, but have made some progress in ascertaining its worth in this respect since last year. As stated in the annual report of last year, p. 94, we did not succeed in making rye ensilage up to our ideal. It has been stated that rye would not make good ensilage, and by persons who have more than once made the attempt. This is not strictly true. We succeeded this year in making first-class ensilage, but after having succeeded thus far the difficulty met us as to how it could be kept good when feeding it, for we found that the uncovered surface dried too quickly between the periods of feeding, and so rendered the rye unpalatable to the stock. It will be a part of our duty another year to try and overcome this difficulty.

The best time to cut rye for cured fodder and also for being made into ensilage is as yet an unsolved problem. We have got good results from cutting when the head had just reached its full length. Some argue that it should be cut a little sooner. For ensilage we cut the rye when in the early blossom. It was most thoroughly tramped in the silo and weighted down with boards and stones. Whether the thorough trampling alone would be sufficient we cannot say as yet, but at all events the ensilage made was of an excellent quality.

Of rape, 40 acres were grown. It was all grown in drills, and after the crop of rye had been removed we pastured somewhat more than fifteen lambs on each acre for more than two months. The return per acre then was two tons of rye fodder, and pasturage for at least fifteen lambs per acre for more than two months. As an offset to the cultivation given to the rape the land was cleaned. The full returns cannot be given until the lambs leave the farm, when a bulletin will be issued covering the whole subject at issue. I desire to say here, however, that my good opinion of the value of rape as a cleaning crop, and as a pasture for fattening lambs upon has been strengthened by our experience with it this year. More food apparently was obtained from it acre for acre than in 1890, although the crop did not appear so vigorous. Our surmise is, that as the rape was more matured this year there was more value in it as a food. I do not think very highly of the feeding value of immature rape. This opinion is to some extent based on experience, but it is experience that requires further confirmation.

3. Catch Crops.

The term *catch* crops is used here in the sense of crops that are grown upon land when it would otherwise be idle. A wide field for investigation lies open here, which in this country can scarcely be said to have been entered upon as yet. We are told that when lands are not producing, and which are destitute or mainly destitute of vegetation, there is considerable loss of plant-food from the washing out of the soil through filtration. The statement is doubtless true. The moral is, keep the land at work. Again, when land is idle weeds are much inclined to establish themselves. When crops are kept to as great an extent as possible the weeds are kept in the background. And yet again, when land is idle it gathers little or no fertility. When it grows a crop for pasture, for plowing in, or for winter feeding where the manure is to be put back on the land, there is an accumulation of fertility, to some extent at least, drawn from the air and from the subsoil. Vegetable matter is put into the soil which keeps it open and porous, provides plant food, and reacts favorably on the retentive powers of the soil.

It is an excellent practice to plow land shallow after grain crops have been removed, and as soon thereafter as possible. We practice it largely at this farm. It tends to bury weeds that are growing, to cause weed seeds to germinate that are lying in the soil, and renders the late deep autumn plowing easy of accomplishment. But this is not all. In seasons not too dry a catch crop may be grown upon the land thus overturned. The only extra cost involved would be the seed, the sowing and the harrowing. We grew barley after a green crop of oats, peas and vetches had been cut for green fodder. It grew to the height of one foot before it was eaten off by the live stock in October. Buckwheat was sown after winter wheat and produced a good green crop for plowing under. But as the frost came late this year, it would not probably do so well some seasons. Rape was sown and produced good pasture for lambs and a good quantity of it. As a green manure rape probably stands at the head of these catch crops, as it may be sown as late as the end of August, and will then make considerable growth.

III. THE LIVE STOCK OF THE FARM.

1. Horses.

Nothing worthy of special notice requires to be said in reference to the horses. We only keep what are wanted to do the work and, indeed, scarcely enough for this purpose, as in winter we have not sufficient profitable work for all the teams that could be profitably employed in the summer. We have found it more profitable to hire some team-work n the spring seeding especially. Farmers who live near cities may do something on the same lines with advantage at such seasons.

2. Cattle.

The stock of cattle is being materially strengthened by an importation from England. The selections were made by the Hon. John Dryden, Minister of Agriculture. They have not as yet arrived here from Quebec, where they are detained in quarantine. The purchases include specimens of the Red Poll, Aberdeen Poll, Galloway, Sussex, Ayrshire and Guernsey breeds. The following particulars are subjoined :

Class of Animal.	Purchased from.	Price.		
1 Red Poll bull calf	Garret Taylor, Norwich	£ 26	5s	0d
2 " heifers	" "	84	0	0
1 Aberdeen Angus Poll bull	O. C. Wallace, Wylane-on-Tyne	105	0	0
1 Galloway bull	Jas. Cunningham, Tarbroech	35	0	0
2 " heifers	" "	40	0	0
1 Sussex bull	Joseph Godman, Godalming, Surrey.	63	0	0
2 " heifers	" " "	42	0	0
1 Ayrshire bull	Jas. McQueen, Crofto	12	10	0
2 " cows	" "	40	0	0
2 Guernsey heifers	C. Middleton	56	14	0

The voyage over proved to be very stormy insomuch that the Guernseys and one Ayrshire heifer were lost on the way.

3. Sheep.

As no sheep were imported since 1884. it was thought better to bring out fresh blood from Britain. The following particulars relate to this importation :

Class of Animal.	Purchased from.	Price.		
1 South Down ram	Garret Taylor, Norwich	£20	0s	0d
5 " ewes	" "	35	13	0
1 Shropshire ram lamb	Geo. Thompson, Warwick	24	11	8
4 " ewes	J. B. Jones, Salop	30	0	0
3 " "	D. Buttar, Coupar Angus	21	0	0
3 " "	C. F. Clarke, Wootverhampton	14	3	6
1 Oxford Down ram lamb	J. B. Ellis, West Baisham	13	13	0
4 " ewes	" "	29	8	0
1 Hampshire Down ram lamb	W. Merton, Wallingford	15	15	0
4 " ewes	" "	29	8	0
1 Suffolk Down ram lamb	Marquis of Bristol.	15	15	0
4 " ewes	"	25	4	0
1 Dorset Horn ram lamb	William Mayo, Friar Waddon	8	8	0
8 " ewes	" "	42	0	0
1 Leicester ram lamb 4 " ewes	T. Hutchinson.	31	10	0

Unfortunately the Leicester ram lamb arrived at the farm in a drooping condition, and died a few days later.

We purchased 666 lambs in the autumn to be fattened on rape. The investment in this class of lambs promises nearly as well as last year, notwithstanding that we purchased at a time when lambs were dear. In November and December lambs sold very low in the American markets, owing to the large numbers shipped to them at the season mentioned. Our dealers lost heavily because of this in many instances. I desire again to emphasise the importance to farmers of making some provision which will enable them to carry a large porportion of their lambs into the winter months. Good prices can be obtained for them after the holiday season. They are quite as easily bred as any other class of live stock. There is room for much extension in the rearing and fattening of good lambs. It is also greatly important that the ram lambs be castrated when young, and that all lambs be docked at that time. Where lambs are purchased for feeding they should at once be castrated, if this has not already been done.

4. Swine.

There was an importation of 3 Tamworth pigs made during the year. They were bought from R. Ibbotson, Knowle, Warwickshire, and cost in England £12 12s. 0d.

As an estimate was made for a piggery, last winter, a heavy stock of pigs was carried through the summer. The pens were overcrowded most of the time, and this is our position at the present time, to some extent. Plans for a new piggery have been submitted which will doubtless be erected next season, when we will be enabled to give greatly increased attention to this important branch of farm husbandry.

IV. MISCELLANEOUS ITEMS.

1. The Exhibits Made.

An extensive exhibit of grain and corn was made at the Toronto Industrial Exhibition, and also at the Western Exhibition, London. These exhibits are more fully described in the report of the Experimental Department. They bore testimony to the nature of the work being done at this station in various lines, and also to its extent, and evoked much favorable comment from visitors and the press. The grade steers of the different beefing breeds and the native or "scrub" animal were exhibited at Toronto.

While it may be necessary sometimes to make these exhibits, it is at least questionable if they should be made every year. To prepare the grains for exhibition involves a very great amount of labor, at a season when the kind of labor required can be but ill spared from the Experimental Department. If the work in this department falls behind at the season of exhibitions it is almost impossible to overtake it again the same season. I am, therefore, of the opinion that once in three years would be sufficiently often to make an agricultural experiment station exhibit, to enable the public to become acquainted by ocular demonstration with what was distinctively new and important.

The behavior of the steers mentioned above while on exhibition has convinced me that animals under experiment should not be removed from their ordinary surroundings. These steers all lost materially in weight when on exhibition in Toronto, and as the losses were not uniform the experiment is so far marred.

2. The Sale of Live Stock.

The annual sale of live stock was held October 7th, and though fairly successful was less so than that held at a corresponding date the previous year. The idea has been freely expressed by farmers residing in remoter parts of the province, that in justice to them they should be held sometimes in other sections. They argue that the centre in which these sales are held is not specially in need of a supply of pure bred animals for breeding purposes, that those living remote and who stand most in need of such animals are unable to attend the sales, to say nothing of the question of freights. It is certainly true that ordinarily the larger half of the stock sold at these sales is bought by purchasers within a radius that is comparatively circumscribed. It is but rarely that a good animal is bid off to go to the extreme limits of the province. Since these annual sales are of undoubted advantage to the farmers, it may be worth while to consider whether the benefit would not be increased by trying an experiment in the direction indicated.

3. The Sale of New Grains and Potatoes.

New grains were sold in lots varying from one-eighth of a bushel to two bushels at the annual sale and at moderate prices. In this way a considerable amount of valuable seed was distributed, and lots of new varieties of potatoes were bought to be tried in various localities. Winter wheats were also sold in lots varying from one-half bushel to two bushels and in consequence a large number of farmers were enabled to get a supply of seed. We feel that this department of the work must be conducted with the greatest care. Our first duty here in reference to products that grow out of the soil is to test them and to glean all we can about their characteristics and capabilities. But in gaining this information we are enabled to grow considerable quantities of the seed. A part of this we distribute for testing in connection with the experimental union work described towards the close of this volume. We have sometimes a considerable quantity over and above what is distributed. To get this surplus into the hands of the farmers is a work that requires much care and prudence.

4. Visitors to the Station.

It is estimated that no less than 15,000 persons visited the station during the year Although a large proportion of these came along with the unusually large excursion parties that visited the farm, yet a very large number came at other times. When the weather is fair the stream of visitors is constant and it increases as time goes on. It is very gratifying to see so great an interest thus manifested in the work of the station. It is in this way that benefits to be derived from its existence may be learned to a considerable extent. But the arrangements for the entertainment of visitors at least so far as the Farm and Experimental Departments are concerned do not seem to be complete as yet. A large proportion of them are allowed to go about without a guide, and hence they do not see nor are they made acquainted with much that is important in regard to the work. No one in particular seems to be in fault. The heads of the departments would gladly spend their time in this way, but oftentimes they are unable to do so. The subordinates also have their work to attend to. To remedy this state of matters, I would respectfully suggest that the services of some one be secured whose special duty would be to see that visitors were properly entertained. When not so engaged there would be no difficulty as to the proper occupancy of the spare moments.

EXPERIMENTAL DEPARTMENT.

By Thomas Shaw, Superintendent of Experiments, and C. A. Zavitz, B.S.A., Assistant Superintendent of Experiments.

The extent of the work in this department during 1891 was far in advance of anything ever attempted before in the history of the institution, and this will apply not only to the field experiments but also to those relating to live stock.

The following is a concise summary of the principal experiments conducted :

FIELD EXPERIMENTS.

1 Winter wheat	88	Plots
2 Spring "	86	"
3 Oats	175	"
4 Barley	104	"
5 Peas	44	"
6 Fodder corn	125	"
7 Mixed grains	16	"
8 Potatoes	81	"
9 Turnips	91	Plots.
10 Mangels	51	"
11 Sugar beets	14	"
12 Carrots	25	"
13 Millet	18	"
14 Clover	18	"
15 Grasses	19	"
16 Rape	88	"
Total	1,043	

These include experiments with different varieties, methods of cultivation, different dates of seeding, fertilisers, etc., and they cover an area of about 100 acres.

LIVE STOCK EXPERIMENTS.

1 Cattle, four experiments	20	Animals.
2 Lambs, five experiments	221	"
3 Swine, three experiments	24	"
Total	265	

These experiments relate to the feeding and handling of the animals, to the manurial product, and to the effects of close confinement.

CO-OPERATIVE EXPERIMENTS.

A system of co-operative experiments is carried on over the province through the Experimental Union, an association composed of officers, students and ex-students of the College. A cordial invitation is extended to all progressive farmers to co-operate in this work. Seed and fertilisers with the necessary instructions are furnished by the station. The number of these experiments conducted during the present season is as follows :

1 Fertilisers	70	Plots.
2 Lucerne and fodder corn	196	"
3 Roots	350	"
4 Spring grains	1,026	"
5 Winter grain	1,000	"
Total	2,642	

These include 12 distinct experiments, each of which is also carefully conducted at this station.

The success of the experimental work was beyond the most sanguine expectations. Generally speaking, this will apply to both the field and live stock experiments. The only failures in the field experiments relate to the peas grown upon the small plots and to carrots. The yield of the different varieties of wheat was beyond all precedent on this farm, and the returns obtained from very many of the varieties of spring grains, more especially barley and oats, were very large. This is to be attributed very largely to the favorable weather, but to some extent it is also due to the fact, that a large proportion of the experimental grains were grown in a field on a part of the farm which we consider better adapted to the purpose than most other portions of the same.

The live stock experiments were equally successful. Of the 265 animals under experiment one died, and in nearly all of them the results were very satisfactory. Much of the success is due to the careful selections made by the farm foreman, when making purchases, and also to the careful and skilful management of the experimental feeder.

It may be also mentioned here that the co-operative experiments were more than ordinarily successful, although complete reports have not been obtained from them up to this date. These returns will be compiled and will be embodied in the Union Report appended to this volume.

As it is of great importance in connection with experimental field work to note the temperature of the weather and the amount of rainfall, we append the following in egard to these observations made upon the premises the past five years:

Month.	1887.	1888.	1889.	1890.	1891.
	inches.	inches.	inches.	inches.	inches.
May	1.58	1.08	3.59	2.18	.68
June	2.36	2.92	4.25	5.31	1.15
July	.61	2.21	2.67	1.44	3.54
August	2.71	2.16	1.92	1.74	3.96
September	1.52	1.55	1.04	.72	2.62
Total	8.78	9.92	13.47	11.39	11.95

The average temperatures for each month of the same period were as follows:

Months.	1887.	1888.	1889.	1890.	1891.
May	60.49	50.98	52.3	50.7	50.4
June	65.02	64.36	59.8	65.4	66.4
July	72.87	67.22	67.8	68.2	62.7
August	65.58	66.56	64.4	62.8	63.7
September	55.83	54.96	58.3	55.4	61.2
Average	63.96	60.82	60.5	60.5	60.9

The different experiments are given below somewhat in detail and in regular order under the respective headings to which they belong.

I.—FIELD PLOT EXPERIMENTS.

1. *Cereals.*

(*a*) Cereals on small plots.
- (1) Barley, comparative test of varieties.
- (2) Barley, different dates of seeding.
- (3) Peas, comparative test of varieties.
- (4) Spring wheat, comparative test of varieties.
- (5) Spring wheat, different dates of seeding.
- (6) Winter wheat, comparative test of Canadian varieties.
- (7) Winter wheat, comparative test of foreign varieties.
- (8) Oats, comparative test of varieties.
- (9) Oats, different dates of seeding.
- (10) Barley, spring wheat and oats sown separately and in mixtures.

(*b*) Cereals on large plots.
- (11) Barley.
- (12) Peas.
- (13) Spring wheat.
- (14) Oats.

2. *Potatoes and Roots.*
- (15) Potatoes, comparative test of varieties.
- (16) Potatoes, different depths of planting the seed tubers.
- (17) Swede turnips, comparative test of varieties.
- (18) Swede turnips, thinning plants to different distances in the drills.
- (19) Fall turnips, comparative test of varieties.
- (20) Mangels, comparative test of varieties.
- (21) Carrots, comparative test of varieties.
- (22) Sugar beets, comparative test of varieties.
- (23) Swede turnips, mangels and sugar beets grown on flat and ridged land.
- (24) Swede turnips, mangels and sugar beets grown upon drills with different distances between them.
- (25) Swede turnips, mangels, carrots and sugar beets grown upon large plots

3. *Silo and Forage Crops.*

(*a*) Crops for the silo.
- (26) Fodder corn, comparative test of varieties on sod and stubble land.
- (27) Fodder corn, with and without salt on four kinds of soil.
- (28) Fodder corn, hills versus drills.

(*b*) Forage crops.
- (29) Rape, application of fertilisers.
- (30) Rape, thinning plants to different distances in the drills.
- (31) Millet, millo-maize and Kaffir corn, test of varieties.
- (32) Clover, comparative test of varieties.
- (33) White or table mustard.
- (34) Grasses grown singly.
- (35) Grasses grown in mixtures.

Grain exhibit during the autumn of 1891.

II. LIVE STOCK EXPERIMENTS.

- (36) The fattening of cattle on silage and meal; silage, hay and meal; and roots, hay and meal.
- (37) The fattening of unshorn and autumn shorn lambs in winter.
- (38) The feeding of lambs on rape, and finishing them on a winter ration of hay, grain and roots, for shipment to Great Britain.
- (39) The feeding of pigs on silage and meal; roots and meal; and meal alone.
- (40) The feeding of pigs on a ration of peas and barley whole; peas and barley ground; and a mixture of various kinds of meal.
- (41) Feeding grade steers of different breeds.
- (42) A feeding experiment between the imported Yorkshire and Berkshire breeds of swine.
- (43) An experiment to determine the amount of manure made by a cattle beast during the successive periods of growth.
- (44) A test to determine the effects of constant confinement upon the breeding properties of a cattle beast.
- (45) The feeding of lambs upon rape alone, rape and oats and rape and pasture.
- (46) The feeding of lambs upon rape alone when the conditions for the crop are very favorable.
- (47) The feeding of lambs upon rape grown after winter wheat.

III. CO-OPERATIVE EXPERIMENTS.

(48) Testing superphosphate, dried blood, and scrap, farmyard manure, and no manure with oats.
(49) Comparing the advantage of nitrate of soda over no fertiliser with spring wheat.
(50) Ascertaining the relative value of planting corn in hills as against drills.
(51) Growing lucerne as a crop for fodder.
(52) Testing six promising varieties of corn.
(53) Testing five promising varieties of turnips.
(54) Testing five promising varieties of mangels.
(55) Testing five promising varieties of carrots.
(56) Testing six promising varieties of spring wheat.
(57) Testing six promising varieties of barley.
(58) Testing six promising varieties of oats.
(59) Testing six promising varieties of winter wheat.

I. FIELD PLOT EXPERIMENTS.

The field plot experiments during 1891 belong to 10 different fields according to their adaptation, and cover about 100 acres. They varied in size from ·00168 of an acre to 2 acres.

1.—Cereals.

Of these, 344 varieties were grown in 1891, and in most instances they represent the first, second or third year's crop from Ontario and foreign grains. The foreign grains have nearly all been imported within the past three years. They were obtained from the following countries, viz., Germany, Sweden, Russia, Scotland, England, France, Australia, Italy, Hungary, Greece, Sicily, Africa, Egypt, New Zealand and the United States. When grains are first introduced we grow them on small plots. Those which promise well we sow upon larger plots the second year. If they still maintain their reputation they are sown on yet larger areas the third year, so that a supply of the seed may be available for distribution. All the grains grown in the plots are also grown in single rows and usually in another field. Each row is 2 rods long, and 200 grains are sown in a row. The objects of sowing them thus are: (1) To give information as to germination; (2) to give opportunity for comparison as to strength of straw, rust, height of grain, etc., and (3) to furnish supplies for exhibition purposes without interference with the crop grown upon the measured plot.

(*a*) *Cereals on Small Plots.*—Heretofore nearly all of these grains were grown upon low-lying fields, where they were much subject to injury from rust. We also consider that where experiments have been grown upon the same plot for three years an unevenness in the quality of the soil arises from the variations in the crops grown each year, and therefore it is necessary to change the plots. We selected for this purpose an elevated field with soil less variable than is usually found upon this farm, and which has been evenly cropped during previous years. It grew a crop of oats in 1889. In the spring of 1890 farmyard manure was applied at the rate of 15 loads per acre, and a crop of rape was grown upon it the same autumn which was pastured off by lambs. It may be well to mention here that all the yields per acre which are given and which are comprised under this heading are estimates based upon the yields of the small plots.

(1) Barley, Comparative Test of Varieties.

In 1891, 63 varities of barley were grown. The size of the plots is one one-hundredth of an acre. The grain was sown April 30th and May 1st, except those numbered 53, 54, 56 and 57 on the list which were sown May 11th. The seed was sown broadcast at the rate of two bushels per acre. The ground was then harrowed and rolled. Tables I, II and III give the yields of the varieties grown for three years, two years and one year respectively. Table IV gives the characteristics relating to the 63 varieties grown during 1891. The varieties are arranged in each table according to the average yields of grain per acre for the period indicated. Table V gives the yields per acre of the six varieties of Hulless barley grown for two years past.

TABLE I. Yields of thirty-seven varieties of Barley for three years.

Varieties.	Weight per measured bushel.		Straw per acre.		Grain per acre in bushels (48 lb).	
	1891	Average 1890-1891	1891.	Average 1889-90-91.	1891.	Average 1889-90-91.
	lb.	lb.	tons.	tons.		
1 Mandscheuri	50⅓	50⅞	2.14	1.84	82.6	9.1
2 Chevalier (France)	52½	52 5/12	2.03	1.79	69.5	4.8
3 Empress	53¼	52¼	2.32	2.05	71.6	54.1
4 Hallett's Pedigree	53	53½	2.14	1.73	76.3	53.0
5 Oderbrucker	53¼	53¾	1.62	1.49	65.9	52.5
6 Scotch Improved	51¼	51⅝	1.50	1.35	68.8	52.5
7 Improved Golden Melon	53	52¼	2.53	1.82	75.3	51.1
8 Improved Cheyne	52¾	52⅓	2.44	1.98	71.1	50.3
9 Kalina	51¾	52¼	2.33	1.79	73.7	50.0
10 Imperial	52½	52⅜	2.38	1.98	68.5	50.0
11 Thanet	53¼	51⅞	2.36	1.79	71.6	49.4
12 Selected Chevalier	52¾	51⅝	2.12	1.87	61.7	49.2
13 Common six-rowed	51⅓	53	1.37	1.31	60.7	48.0
14 Golden Drop (Germany)	53¾	53⅝	1.97	1.88	58.6	47.1
15 Peerless White	53½	53¼	2.37	1.73	74.7	46.8
16 Improved Imperial	44⅓	46⅛	2.76	1.95	73.7	46.5
17 Phœnix	52¼	52⅝	1.68	1.73	57.0	45.9
18 Improved Beardless	52¼	51¼	2.31	1.92	69.5	45.3
19 Cheyne	51	52¼	.92	1.76	38.8	45.2
20 Early Black	49⅓	50¼	1.36	1.52	44.5	44.7
21 Two-rowed Italian	52⅓	52⅓	1.72	1.89	70.6	44.5
22 Golden Drop (Eng.)	52¼	51¾	1.87	1.69	57.0	42.7
23 English Malting	52¾	52¾	2.18	1.71	64.3	41.7
24 Two-rowed Spreading	50½	50	1.54	1.52	54.4	41.2
25 Carter's Prize Prolific	52¾	52¾	2.03	1.99	56.5	40.4
26 Kinna Kulla	52¼	50¼	2.08	1.62	69.0	39.9
27 Probsteier	53	52⅓	1.53	1.63	47.7	39.7
28 Chevalier (Scotland)	52¾	53⅛	1.97	1.41	66.4	39.6
29 Golden Melon	52¼	52½	1.97	1.40	58.6	38.7
30 Beardless	50¼	51⅛	2.44	1.70	58.6	38.3
31 Invel	51	51¼	1.81	1.46	59.6	37.9
32 Annats	51¼	51⅝	2.04	1.47	60.7	37.8
33 Emperor	50¼	52⅛	1.66	1.81	44.0	35.8
34 Italian Rice	50¼	50⅛	1.34	1.47	26.6	35.8
35 Scholey's Chevalier	50½	51¾	1.47	1.45	40.0	35.8
36 Pfanen	51	51⅓	1.74	1.46	49.2	35.5
37 Dutch	48¾	46⅜	1.63	1.51	40.4	30.6
Average	51 7/10	50⅜	1.93	1.67	61.01	44.6

The Mandscheuri, a six-rowed variety, has given the highest average yield per acre for the past three years. It was imported for this station from Russia in the spring of 1889, and is probably the same as the Mensury. The Oderbrucker from Germany has given the highest average weight per bushel for the past three years, viz., 53¾ lb. It is a six-rowed variety and stands fifth in point of yield. The common Canadian six-rowed variety stands 13th in the list in point of yield.

TABLE II. Yields of nine varieties of Barley for two years.

Varieties	Weight per measured bushel.		Straw per acre.		Grain per acre in bushels (48 lb).	
	1891.	Average 1890-91.	1891.	Average 1890-91.	1891.	Average 1890-91.
	lb.	lb.	tons.	tons.	bush.	bush.
38 Chevalier (France)	53¼	53⅞	2.26	1.91	73.2	57.2
39 Early Minting	52¾	52	2.27	1.90	69.5	56.3
40 Chevalier (New Zealand)	52¾	53½	2.01	1.83	62.8	53.5
41 Australian	51½	51⅛	2.33	1.78	71.6	53.4
42 Mensury	51½	51½	1 44	1.34	63.8	51.3
43 Cape	45	48	1.24	1.29	48.2	49.7
44 Italian	52¾	52⅙	1.63	1.89	60.2	49.5
45 Diamond	52¼	52⅛	1.86	1.39	58.1	42.3
46 Very Early Lapland	46¾	47⅜	1.60	1.21	63.5	39.7
Average	50.94	51.38	1.85	1.62	63.4	50.3

The best yielding variety for two years is the Chevalier, imported from France. Two lots were imported in 1889. Both have done well. It is probable they are one and the same variety grown in different sections of France. One of these lots grown for three years is second in point of yield. The other was not reported on the first year of importation owing to a mishap. This is the variety which now stands first in point of yield for two years. It also gives the highest weight per bushel The Chevalier from New Zealand comes third in yield for two years, and second in weight of grain per bushel.

TABLE III. Yields of eleven varieties of Barley for 1891.

Varieties.	Weight per measured bushel.	Straw per acre (tons).	Grain, yield per acre (bush. 48 lb.)
47 Highland Chief	52	2.71	81.0
48 Duckbill	52¼	2.22	75.2
49 Six-rowed, Baxter's Improved	52¼	1.78	72.9
50 Salzer's Californian Prolific	53¾	1.76	72.4
51 Mansury	50	1.70	71.9
52 Imperial, six-rowed	51¾	1.66	70 6
53 California Brewing	44¾	1.64	66.9
54 Carter's Goldthorp	51¼	1.91	64.3
55 Martin West	54¾	1.56	61 7
56 Carter's Prize Prolific	52	2.13	60.7
57 California Chevalier	51	2.07	59.6
Average	51.43	1.92	68.83

The Highland Chief heads the list in point of yield for one year; of the 63 varieties grown in 1891 it has only been surpassed by the Mandscheuri. The Duckbill variety which came second in point of yield is supposed to be not true to name, but further tests will conclusively settle this point. Carter's Goldthorp and Carter's Prize Prolific in the above list were presented to this Station by the seed firm of Jas. Carter & Co., London, England, in the spring of 1891.

TABLE IV. Characteristics of sixty-three varieties of Barley.

Varieties.	Seed obtained from	Number of year's growth reported upon.	Date of maturity	Length of plant.	Strength of plant.	Two or six-rowed variety.
				inches.		
1 Mandscheuri	Russia	3	Aug. 14	...	Medium	6 rowed.
2 Chevalier (France)	France	3	" 14	31	Strong	2 "
3 Empress	England	3	" 19	35	"	2 "
4 Hallett's Pedigree	Germany	3	" 19	31	Medium	2 "
5 Oderbrucker	“	3	July 31	34	Strong	6 "
6 Scotch Improved	Ontario	3	Aug. 1	33	"	6 "
7 Improved Golden Melon	England	3	" 18	38	Weak	2 "
8 Improved Cheyne	“	3	" 15	35	Medium	2 "
9 Kalina	Sweden	3	" 14	36	"	2 "
10 Imperial	France	3	" 14	36	"	2 "
11 Thanet	England	3	" 18	39	"	2 "
12 Selected Chevalier	“	3	" 18	35	Strong	2 "
13 Common six rowed	Ontario	3	" 30	33	Medium	6
14 Golden Drop	Germany	3	" 19	37	Weak	2 "
15 Peerless White	Ontario Dom. Ex. F.	3	" 19	35	"	2 "
16 Improved Imperial	Germany	3	" 17	38	"	6 "
17 Phœnix	“	3	" 15	38	"	2 "
18 Improved Beardless	England	3	" 15	35	Strong	2 "
19 Cheyne	Germany	3	" 19	38	Medium	2 "
20 Early Black	France	3	" 14	27	Strong	6 "
21 Two-rowed Italian	“	3	" 10	33	Medium	2 "
22 Golden Drop	England	3	" 18	36	"	2 "
23 English Malting	Ontario Dom. Ex. F.	3	" 19	39	Strong	2 "
24 Two rowed Spreading	France	3	" 13	30	"	2 "
25 Carter's Prize Prolific	England	3	" 19	38	Medium	2 "
26 Kinna Kulla	Sweden	3	" 11	43	"	2 "
27 Probsteier	Germany	3	" 19	32	"	2 "
28 Chevalier	Scotland	3	" 18	39	"	2 "
29 Golden Melon	Germany	3	" 19	38	Strong	2 "
30 Beardless	Ontario Dom. Ex. F.	3	" 20	41	"	2 "
31 Invel	Germany	3	" 19	36	"	2 "
32 Annats	Scotland	3	" 10	38	Medium	2 "
33 Emperor	Germany	3	" 19	37	"	2 "
34 Italian Rice	“	3	" 15	25	Strong	2 "
35 Scholey's Chevalier	“	3	" 21	37	"	2 "
36 Pfanen	Sweden	3	" 11	43	"	2 "
37 Dutch	Germany	3	" 22	37	"	2 "
38 Chevalier	France	3	" 15	36	Medium	2 "
39 Early Minting	England	3	" 16	35	Weak	2 "
40 Chevalier	New Zealand	2	" 19	37	Medium	2 "
41 Australian	Germany	2	" 15	37	Weak	2 "
42 Mensury	Ontario	2	July 30	34	Medium	6 "
43 Cape	New Zealand	2	Aug. 14	...	...	6 "
44 Italian	Italy	2	" 12	36	Strong	2 "
45 Diamond	Germany	2	" 14	37	"	2 "
46 Very Early Lapland	Russia	2	" 10	31	...	6 "
47 Highland Chief	United States	1	" 13	38	Weak	2 "
48 Duckbill	Ontario	1	" 9	30	Strong	2 "
49 Six-rowed Baxter's Improved	“	1	" 1	36	Medium	6 "
50 Salzer's California Prolific	United States	1	" 8	37	Strong	2 "
51 Mansury	“	1	" 1	36	Medium	6 "
52 Imperial six-rowed	Ontario	1	" 1	39	"	6 "
53 California Brewing	United States	1	" 12	32	Strong	6 "
54 Carter's Goldthorp	England	1	" 28	40	"	2 "
55 Martin West	United States	1	" 10	34	"	2 "
56 Carter's Prize Prolific	England	1	" 26	39	"	2 "
57 California Chevalier	United States	1	" 18	39	"	2 "
58 Hungarian	Hungary	2	" 11	33	"	6 "
59 Guymalaya	Sweden	2	" 14	36	Weak	6 "
60 Black Hulless	Ontario	2	...	32	"	6 "
61 Large Skinned	France	2	Aug. 14	27	"	2 "
62 Three-rowed	Germany	2	" 12	31	"	6 "
63 Skinless	Australia	2	" 1	21	"	6 "

It will be observed that while the best yielding varieties are imported they come from various countries of the continent of Europe. While two-rowed barley is often looked upon as one variety, in reality the two-rowed sorts are quite the more numerous.

TABLE V. Yields of six varieties of Hulless Barley.

Varieties.	Weight per measured bushel.		Straw per acre.		Yield of grain per acre.	
	1891.	Average 1890-91.	1891.	Average 1890-91.	1891.	Average 1890-91.
	lb.	lb.	tons.	tons.	bush (60 lb)	bush (60 lb)
58 Hungarian	60.7	61.5	1.73	1.69	55.2	48.0
59 Guymalaya	58.7	59.9	2.51	1.98	63.9	40.5
60 Black Hulless	65.5	64.6	1.64	1.45	52.7	38.9
61 Large Skinned	60.2	61.6	1.82	1.34	41.8	29.5
62 Three-rowed	61.0	61.0	1.26	1.10	31.8	24.1
63 Skinless	61.0	60.7	1.32	1.00	35.2	22.1
Average	61.2	61.6	1.71	1.42	46.8	33.9

Several of these varieties are possessed of much promise. It will be observed that they weigh so heavily that 60 lb. is the standard per measured bushel. They are all light colored except the Black Hulless. The Hungarian grown for two years is a fine yielding variety and possesses many good qualities. Some of these sorts are deserving of considerable attention for feeding purposes.

(2) BARLEY, DIFFERENT DATES OF SEEDING.

The following table is part of an experiment conducted simultaneously with Spring Wheat and Oats to ascertain the results from sowing these grains at different dates. They were all sown in duplicate plots, and each of the two plots contained a different variety. The plots were 60x10 links. The grain was sown at the rate of two bushels per acre.

TABLE VI. Comparative yield of Barley from different dates of seeding.

Date of Seeding.	Weights per measured bushel.	Amount of straw per acre.	Yield of grain per acre.
	lb.	tons.	bushels.
April 22	50.3	1.17	29 5
May 1	48.6	1.39	37.8
May 9	47.1	1.33	37.8
May 18	45.5	.91	24.8
May 26	44.2	.90	17.7
June 6	42.4	.96	17.4
Average	46.4	1.11	27.5

It will be observed that the yield of the earliest sown plots is less than that from the plots sown next in order of lateness. This may have arisen in part from lack of moisture early in the season, while it may be, on the other hand, that it is possible sometimes to sow barley too early in the spring to get the best yields. The quality of the grain decreased with each successive seeding.

(3) PEAS, COMPARATIVE TESTS OF VARIETIES.

The spring of 1891 proved unfavorable to the germination of peas sown broadcast owing to the lack of moisture. There were 44 varieties sown. The early sorts seemed to suffer more from the drouth than those which matured later. The necessity for sowing them broadcast arose from the desirability of having exact amounts sown, the importance of having them all sown on the same day, and because of the lack of suitable seed drills for this work. Some of the later varieties yielded fairly well, but we have thought it best not to report on them least the results should prove misleading. We hope another year to give all the varieties now on hand a fair trial with other new sorts which we may be able to secure.

(4) SPRING WHEAT, COMPARATIVE TESTS OF VARIETIES.

The report on spring wheat contains four tables. These give the characteristics of the 57 varieties grown during the present year ; the comparative yields of 22 varieties grown for three years ; the comparative yields of 21 varieties grown for two years ; and the same in regard to 10 varieties grown in the same way for one year. The plots were each 100 links long and 10 links broad, each plot therefore contained one one-hundredth of an acre. All the varieties grown this year were sown April 25th, with the exception of the O'Ranagan Valley Velvet Chaff and the Salzers Assiniboia Fyfe, which were sown May 1st. The seed was sown broadcast at the rate of two bushels per acre.

TABLE VII. Yields of twenty-two varieties of Spring Wheat for three years.

	Varieties.	Weight per measured bushel.		Straw per acre (tons).		Grain per acre (bush. equal 60 lb).	
		1891.	Average 1890-91.	1891.	Average 1890-91.	1891.	Average 1889-90 91.
		lb.	lb.	tons.	tons.	bush.	bush.
1	Herison Bearded.	65¼	64⅝	1.20	1.55	34.4	26.6
2	Pringle's Champion..........	62¼	60⅞	1.37	1.64	34 6	23.6
3	Summer	60½	59⅜	1.71	1.61	40.2	22.6
4	Holben's Improved...........	60½	59⅓	1.49	1.60	33.7	21.9
5	Odessa Ghirka...............	62¾	61⅜	1.23	1.37	39.6	21.2
6	Konisburg......	62¼	62 5/16	1.61	1.56	38.8	20.6
7	Saxonka	62¾	60	1.16	1.08	38.2	20.2
8	Ordinary Bearded March.....	61¼	58⅜	1.51	1.52	29.4	20.1
9	Bart Tremenia	62¼	63⅛	1.26	1.43	26.0	19.7
10	King Bartigen......	61¼	58¾	1.56	1.24	34.2	17.1
11	Dantzic	62	60¼	1.14	1.27	29.8	16.9
12	Bearded Red	61	59½	1.23	1.22	30.6	16.9
13	Ordinary March.........	61½	56⅜	1.26	1.08	36.0	16.6
14	Red Bearded March...... ...	59½	58¼	1.11	1.01	27.7	16.2
15	French Summer.......... ..	60½	56⅗	1.33	1.21	34 2	16.2
16	Chidham White	60	56⅙	1.45	1.31	30.8	15.8
17	March Debrie	60¼	56⅝	1.55	1.61	30.3	15.5
18	April Bearded Red	60	55⅖	1.51	1.62	32.9	15.4
19	Nenhert	58½	54	1 48	1.37	33.5	15.3
20	Large Flag.................	61¼	56¼	1.00	.83	28.3	12.6
21	Lonzella White	58¾	52⅛	1.46	1.46	27.4	11.6
22	Hickling's March White	59½	51 7/10	1.48	1.32	28.7	11.4
	Average...............	61	58.28	1.36	1.35	32.7	17.9

The Herison Bearded variety has not only given the largest yield per acre for three years, but has also given the unusual weight per measured bushel of 64⅝ lb. for two years past. It stands stiff in the straw and has been almost entirely free from rust. The club shaped heads are somewhat uneven. Pringle's Champion produces strong straw, has a good shaped head, is not much liable to rust, and produces a fine sample of grain.

TABLE VIII. Yields of twenty-one varieties of Spring Wheat for two years.

Varieties.	Weight per measured bushel.		Straw per acre		Grain per acre (bush. equal 60 lb).	
	1891.	Average 1890-91.	1891.	Average 1890-91.	1891.	Average 1890-91.
	lb.	lb.	tons.	tons.	bush.	bush.
23 Red Fern	63	61½	2.08	1.92	44.6	33 25
24 White Russian	60¾	59	1.54	1.73	36.9	29 50
25 White Fyfe	60½	60¼	1.37	1.38	30.4	28.65
26 Triumph	61¼	60⅝	1.42	1.22	35.0	25.50
27 Red Fyfe	61	60¼	1.60	1.78	34.8	25.16
28 Colorado	62	61⅓	1.53	1.30	31.5	23.65
29 Wild Goose	60½	61⅝	1.33	1.80	34.2	23.55
30 Grecian	54½	57⅛	1.57	1.43	31.6	22.70
31 Sorentino	60½	60¼	1.26	1.19	28 3	21.65
32 Ladoga	61	58¾	1.28	1.31	30.0	21.25
33 Mountain	58½	58⅝	1.62	1.15	32.5	20.85
34 Vota	57	57½	1.39	1.38	28.5	20.70
35 Kubanka	61½		1.68		37.9	20.60
36 Atalank	58¾	58⅛	1.25	1.24	28.9	20.50
37 Square Head	59¾	54⅝	1.52	1.24	25.8	20.40
38 Algiers	59¾	59	1.27	1.22	28.7	20.40
39 Paros	56¾	57⅛	1.39	1.33	26.0	19.90
40 Neapel	59¾	55⅝	1.50	1.39	28.7	19.15
41 Medeah	60½	61½	1.28	.95	23.1	19.10
42 March White	63	59½	.99	.84	26.8	18.50
43 African	56½	56½	1.10	.88	33.1	18.07
Average	59.8	59.0	1.43	1.33	31.3	22.5

Of the 21 varieties grown for two years, the Red Fern has a decided lead in point of yield. It is only surpassed in weight per measured bushel by the Wild Goose. The Red Fyfe, so much in favor with the millers, is fifth in point of yield. The Ladoga has tenth place. It is evidently not so well suited to this part of the province as some other varieties.

TABLE IX. Yields of ten varieties of Spring Wheats for one year.

Varieties.	Weight per measured bushel.	Straw per acre.	Grain per acre.
	lb.	tons.	bush.
44 McCarlin	59	1.75	37.00
45 Rio Grande	61	1.83	36.70
46 Salzer's Assiniboia Fyfe	58¾	1.53	32.20
47 Anglo-Canadian	58¼	1.81	31.80
48 Pringle's Defiance	60	1.36	31.60
49 Bearded Manitoba	58¼	1.07	31.60
50 Saskatchewan Red Fyfe	61	1.37	30.90
51 Washington	59	1.30	30.80
52 Manitoulin	60½	1.18	29.60
53 O'Ranagan Valley Velvet Chaff	57½	....	25.00
Average	59.3	1.47	31.72

The McCarlin variety which heads this list was obtained in Eastern Ontario, where it has been grown for several years. It is a strong growing variety, has a bearded head, and a large grain.

TABLE X. Characteristics of fifty-three varieties of Spring Wheat grown in 1891.

	Varieties.	Variety obtained from.	Number of years' growth reported upon.	Date of maturity.	Length of plant.	Strength of straw.	Nature of head.	Color of grain.
				Aug.	in.			
1	Herison Bearded	France	3	11	35	Strong	Bearded	Red.
2	Pringle's Champion	Germany	3	11	34¾	“	“	“
3	Summer	“	3	11	32	Medium	“	“
4	Holben's Improved	“	3	13	36¼	Strong	Bald	“
5	Odessa Ghirka	Russia	3	10	35	Medium	“	“
6	Konisburg	“	3	10	33	“	Bearded	“
7	Saxonka	“	3	11	39½	“	Bald	“
8	Ordinary Bearded March	France	3	11	34	Strong	Bearded	“
9	Bart Tremenia	Greece	3	12	34	“	“	“
10	King Bartigen	Germany	3	11	33	Medium	“	“
11	Dantzic	Russia	3	11	33	“	“	“
12	Bearded Red	France	3	10	34	Weak	“	“
13	Ordinary March	“	3	10	31½	Strong	Bald	“
14	Red Bearded March	“	3	11	38	Medium	Bearded	“
15	French Summer	“	3	13	36	Weak	Bald	“
16	Chidham White	Germany	3	17	33	Strong	“	White.
17	March Debrie	France	3	17	36½	“	“	“
18	April Bearded Red	England	3	13	41	Weak	Bearded	Red.
19	Nenhert	Germany	3	15	37¾	Strong	Bald	“
20	Large Flag	France	3	15	31	“	“	White.
21	Lonzella White	“	3	19	36	Weak	“	Red.
22	Hickling March White	“	3	17	37½	Strong	“	“
23	Red Fern	Ontario	2	9	39	“	Bearded	“
24	White Russian	“	2	11	33	Medium	Bald	White.
25	White Fyfe	“	2	13	34	Strong	“	“
26	Triumph	“	2	11	31¼	“	“	Red.
27	Red Fyfe	“	2	13	41	“	“	“
28	Colorado	“	2	8	38¾	“	Bearded	“
29	Wild Goose	“	2	14	39	Medium	“	“
30	Grecian	Russia	2	15	40	“	“	“
31	Sorentino	Italy	2	14	36	“	“	“
32	Ladoga	Ontario	2	9	36	“	“	“
33	Mountain	Hungary	2	13	37	Strong	Bald	“
34	Vota	Greece	2	15	38	Medium	Bearded	White.
35	Kubanka	Russia	2	11	30	“	“	Red.
36	Atalank	Greece	2	15	35	“	“	“
37	Square Head	Sicily	2	8	38	Strong	Bald	“
38	Algiers	Africa	2	13	35	“	Bearded	“
39	Paros	Greece	2	15	38	Medium	“	White.
40	Neapel	Italy	2	15	37	Strong	“	Red.
41	Medeah	Africa	2	13	36½	“	“	“
42	March White	California	2	8	28	....	Bald	“
43	African	Africa	2	13	32	Strong	Bearded	“
44	McCarlin	Ontario	1	14	42	“	“	“
45	Rio Grande	“	1	13	36	“	“	“
46	Salzers Assiniboia Fyfe	U. S	1	17	39	“	Bald	“
47	Anglo Canadian	England.	1	13	41	....	Bearded	“
48	Pringle's Defiance	Germany	1	14	33	Strong	Bald	White.
49	Bearded Manitoba	Ontario	1	11	37	“	Bearded	Red.
50	Saskatchewan Red Fyfe	“	1	12	35	“	Bald	“
51	Washington	Wash. US.	1	11	32	“	“	White.
52	Manitoulin	Ontario	1	10	35	“	“	Red.
53	O'Ranagan Valley Velvet Chaff.	U. S	1	17	41	“	“	“

It will be observed that the best yielding varieties tested here for three years were obtained from France, Germany and Russia, but it should be mentioned here that nearly all the Canadian varieties have only been tested for two years. Nearly all the foreign varieties are classed as red wheats, and the bearded varieties are somewhat the more numerous. We do not consider this farm well adapted to the growth of spring wheat, and therefore, those varieties which do fairly well here should prove satisfactory, at least in some localities, more favored in this respect.

Report of the Dominion Millers' Association.—Samples of the 53 varieties of spring wheat, grown upon the farm in 1891, were submitted to the Dominion Millers' Association at a largely attended meeting held in Toronto on December 8th of that year. Nine varieties were pronounced by the committee as first-class for milling purposes. They stand in the following order:

1	Red Fyfe	Ontario.
2	Pringle's Champion	Germany.
3	Red Fern	Ontario.
4	Rio Grande	"
5	Herison Bearded	France.
6	Holben's Improved	Germany.
7	Odessa Ghirka	Russia.
8	Colorado	Ontario.
9	White Russian	"

(5) SPRING WHEAT, DIFFERENT DATES OF SEEDING.

The following table is part of an experiment conducted simultaneously with barley and oats to ascertain the results from sowing these grains at different dates. They were all sown in duplicate plots and each of the two plots contained a different variety. The plots were 60 x 10 links. The grain was sown broadcast at the rate of two bushels per acre.

TABLE XI. Comparative yields of Spring Wheat at different dates of seeding.

Dates of seeding.	Weight per measured bushel.	Amount of straw per acre.	Yield of grain per acre.
April 22nd	60.5	1.45	22.9
May 1st	59.0	1.37	19.1
" 9th	56.7	1.04	13.2
" 18th	54.2	.89	8.0
" 26th	53.0	.79	3.9
June 6th	51.5	.76	3.2
Average	55.8	1.05	11.7

The yields of spring wheat decreased with each successive sowing. In the case of the barley the earliest sown did not yield so well as what was sown at the second seeding. It would seem, therefore, that spring wheat will stand to be sown earlier than barley. The decrease in yield of grain per acre, in yield of straw and in weight per measured bushel is continuous with each successive seeding.

WINTER WHEAT, COMPARATIVE TEST OF VARIETIES.

There were in all 51 varieties of winter wheat sown in the autumn of 1890. Of these 10 varieties failed, not being able to withstand the winter. They were all foreign varieties which failed. Of the 41 varieties which are here reported upon, 23 are Canadian and 18 foreign. A bulletin on the 23 Canadian varieties was issued in August and sent out to the farmers before the time for sowing the grain. These varieties were all harvested, threshed and weighed and the report relating to them forwarded for publication on August 10th.

(6) ONTARIO VARIETIES OF WINTER WHEATS.

The winter wheat crop will always be one of considerable importance to Ontario notwithstanding the facilities for growing it in Manitoba and the North-west. This view is supported by the following reasons along with others which might be given:

1. A large portion of the province is well adapted to the growth of wheat. In view of this fact the advantage of growing a less amount than will suffice for home consumption is more than doubtful. Adaptability should always be a prime factor in determining the crops that should be grown. That winter wheat may still be grown in western Ontario in as fine form as in any country in the world has been amply demonstrated by the yields of the present year.

2. The winter wheat crop may with much advantage be made to form a prominent feature of a regular rotation.

3. This crop provides bedding for live stock more abundantly and more cheaply than any crop now grown. This feature alone adds much more to the value of the crop than is generally supposed.

4. It furnishes a crop suitable for sowing grasses along with it, a fact of no little significance in view of the probable decrease in the acreage of barley. It also admits of the autumn sowing of timothy which generally ensures a catch of the seed in any season.

5. The increased attention to stock production will tend to improve the yield per acre owing to the increase of fertilising materials which are thus made available to the farmer.

6. The growth of winter wheat tends to a more even distribution of labor throughout the year.

7. It encourages the manufacture of flour in the country, and this furnishes a plentiful supply of bran, which is almost indispensable for certain feeding purposes.

8. In growing winter wheat for home consumption the farmers always will have protection to the extent of the cost of conveyance from other provinces.

Our farmers should therefore continue to give careful attention to the growth of winter wheat in the parts of the province favorable to the same. The aim should be not so much to grow a large acreage as to adopt such methods of cultivation and to secure such varieties as are likely to give a large yield per acre. With this end in view the importance of good drainage, sowing at the right time and suitable conditions of soil in relation to rotation, fertility and natural adaptability cannot easily be over-estimated. All things considered it would be better not to sow winter wheat at all than to sow it under conditions not likely to produce a good crop.

SELECTION OF VARIETIES. In selecting varieties to sow, a careful regard must also be given to the wants of the millers. Those good yielding varieties only should be grown which are well adapted to milling purposes. Some years ago quantity was the great consideration with the grower. At present quality is at least equally important with quantity. This statement finds ample confirmation in the low price paid for the Wild Goose wheat notwithstanding its ample yields. The choice of the millers is not a mere arbitrary one. As in this fastidious age the tastes of the consumer rule, the miller must cater to those tastes or he will lose his custom. The consumer demands a beautifully appearing snowy white bread, and the miller must furnish flour that will produce it. In this we find one of the principal reasons for his preference for white wheats. The baker wants a strong flour, that is, one rich in gluten, and the miller must give it to him or he will cease to buy. Because of this the Manitoba Fyfe spring wheat stands high in favor with the millers. A heavy weighing wheat gives a larger percentage of flour than a light weighing one, hence the preference of the millers for the varieties which weigh the heaviest. The farmers therefore will do well to give diligent heed to the recommendations of the millers as to the varieties which stand high in favor with them, and in making their selections for sowing they should choose accordingly.

THE VARIETIES GROWN. There were in all some 70 plots of winter wheat grown at this station during the present year, including 51 varieties. A few of the varieties were grown in duplicate plots, and in another field we grew 10 varieties in acre and half acre plots. These larger plots, however, were simply duplicates of varieties grown in the smaller plots, with the exception of the Longberry Red, a variety introduced last year from Indiana, and which through some unfortunate oversight was not grown in the small plots. The details relating to the larger plots will be given in the annual report. Of the 51 varieties 24 were Canadian and American, and 27 were foreign. The foreign varieties came chiefly from Germany, England, France and Russia. As none of the foreign varieties have as yet proved equal to some of the Canadian and American kinds we do not feel justified at present in recommending them to be sown. This bulletin, therefore, gives the particulars relating to 23 Canadian and American varieties grown under exactly the same conditions.

GENERAL CLASSIFICATION OF VARIETIES OF FALL WHEAT.

Bald Head....	White Chaff.	White Grain.	(2) Garfield or Natural Cross.
			(3) Surprise.
			(4) Canadian Velvet Chaff.
			(5) Bonnell or Landreth.
			(11) Winter Pearl.
			(14) Martin Amber.
		Red Grain..	(1) American Bronze.
			(9) Red Velvet Chaff.
			(10) Jones' Winter Fyfe.
			(12) Rogers.
			(19) Golden Drop.
			(23) New Monarch.
	Red Chaff...	White Grain.	(6) Seneca or Clawson.
			(7) Standard.
		Red Grain..	(8) Early Red Clawson.
			(16) Manchester.
Bearded Head.	White Chaff.	White Grain.	(17) Bulgarian.
			(22) Democrat.
		Red Grain.....	(13) Egyptian.
	Red Chaff...	Red Grain..	(15) Golden Cross or Volunteer.
			(18) Red Lyon.
			(20) Hybrid Mediterranean.
			(21) Lancaster.

The above classification is based upon the recognition of all winter wheats as belonging to the bald or bearded varieties. But observe that those varieties with very short beards, often found only on the upper portion of the head, are classified as bald. The wheats in each of these general divisions are again classified according to the color of the grain. It should be borne in mind that sometimes we have white chaff with red wheat, and red chaff with white wheat. The finer distinctions of shade in color, as amber, bronze, etc., are not given in this classification, as they are liable to vary with a change of soil and climate. The number standing before the name of each variety gives the order of the yield of the said variety.

LOCATION AND SOIL. All the varieties of winter wheat both native and foreign were grown in plots side by side in the same range. These plots contain exactly the one-fiftieth of an acre each. The aspect of the land is north-easterly, but the slope is very gentle. The soil may be termed a clay loam with good natural drainage.

PREPARATION OF THE SOIL AND SOWING. The soil was prepared on the bare fallow system, as it was felt that a test of this nature should be made under the most favorable conditions attainable, to bring out to the fullest extent the capabilities of the grains grown. This is the only bare fallow that we had on the farm. The ground was plowed twice the previous summer. Additional surface cultivation was also given. Farmyard manure was applied at the rate of 15 tons to the acre.

MANNER AND TIME OF SEEDING. The seed was sown by hand, as we have no machine suitable for sowing in drills in plots of the size mentioned. The plots were all sown September 4th, with the exception of the Winter Pearl variety, which was sown on September 8th. The same amount of seed by weight was sown upon each plot, and it was sown at the rate of 1⅔ bushels per acre. As the location was favorable, the soil well prepared, the weather favorable from time of sowing until time of reaping, and especially so during the ripening period, as there was no rust or blight to interefere with the filling of the grain, and as all the conditions were exactly similar and favorable to the most complete development, we may safely conclude that a more favorable opportunity for testing the full capabilities of these wheats when at their best could not easily have been furnished.

TABLE XII. Yields of twenty-three varieties of winter wheat, for 1891.

	Varieties.	Weight of grain per measured bushel.	Amount of straw per acre.	Yield of grain per acre (bush. 60 lb.).
		lb.	tons.	
1	American Bronze	63.00	2.16	65.2
2	Garfield or Natural Cross	62.00	2.52	64.4
3	Surprise	63.25	1.99	63.8
4	Canadian Velvet Chaff	62.25	1.82	59.9
5	Bonnell or Landreth	62.75	2.26	59.5
6	Seneca or Clawson	62.75	2.07	58.9
7	Standard	63.50	2.02	58.3
8	Early Red Clawson	62.50	1.93	58.3
9	Red Velvet Chaff	64.00	1.92	56.9
10	Jones' Winter Fyfe	64.25	1.77	56.3
11	Winter Pearl	61.00	2.51	55.5
12	Rogers	62.50	1.83	54.6
13	Egyptian	64.00	1.94	53.4
14	Martin Amber	61.00	2.13	50.4
15	Golden Cross or Volunteer	64.00	2.17	49.9
16	Manchester	64.50	1.53	47.7
17	Bulgarian	64.50	1.60	46.3
18	Red Lyon	64.00	1.67	44.5
19	Golden Drop	63.00	1.61	44.3
20	Hybrid Mediterranean	64.25	1.92	44.0
21	Lancaster	64.50	2.11	42.8
22	Democrat	64.50	1.69	41.6
23	New Monarch	63.50	1.72	40.8
	Average	63.28	1.95	52.93

It will be noticed that in the above table the 23 varieties of wheat mentioned have given most extraordinary yields, and produced wheat of an uncommonly good quality. The highest yield is from the American Bronze, which produced at the rate of 65.2 bush. per acre, and the lowest is from the New Monarch, which produced at the rate of 40.8 bush. per acre. The average yield of the 23 varieties is at the rate of 52.93 bush. per acre. The highest weight per bush. was 64½ lb., reached by several of the varieties; the lowest weight was 61 lb. per bush., and the average weight of the 23 varieties was 63.28 lb. per bush. In view of the extraordinary yields thus obtained, and the even more extraordinary weights of the grain, the curiosity is not unnatural which would desire to know whether these yields have a parallel on the continent of America.

It should be stated here that the weights of the different varieties of wheat, as given in the above table, were obtained from tests conducted at our request by Mr. James Goldie, Guelph, of James Goldie & Sons. When the weights were taken Mr. Goldie considered all the varieties sufficiently dry to grind, with but two or three exceptions.

Discounting the Yield. It may be well, also, to remark that yields such as the above would not have been obtained from whole fields of these respective varieties, nor could they be looked for from cultivation given under average conditions. Small plots yield more relatively than large ones, owing to cultivation around the borders and probably to other causes, and from this extra yield it has been thought that if one-fifth were deducted, the result would be a fair average to expect from a whole field under like conditions in other respects.

Table xiii. Comparative summary results of Winter Wheat.

Class.	Number varieties.	Weight per measured bushel.	Yield per acre. (Standard bushel by weight).
Bald	16	62.88	55.93
Bearded	7	64.25	46.07
White Chaff	15	63.03	54.19
Red Chaff	8	63.75	50.55
White Wheat	10	62.75	55.86
Red Wheat	13	63.71	50.68

From this table it is apparent that when wheat is grown under favorable conditions the bald varieties yield considerably more than the bearded, but that the bearded varieties weigh heavier on an average. It would be interesting to know how far these comparative results would be modified on soils less fertile and in seasons less propitious. The white chaff varieties were also the best yielders, but they did not quite equal the red chaff varieties in weight, and the white grain varieties also gave the highest yield per acre, but the red grain varieties were ahead in weight.

Table xiv. Interesting particulars relating to the different varieties of Winter Wheats.

	Varieties.	Date of maturity.	Length of plant.	Width of 25 straws side by side.	Average length of 10 heads.	Average No. of grains per head.	Weight of 1,000 grains. in grammes.
		July.	inches.	mm.	inches.		
1	American Bronze	22	39	97	3.1	29.2	47.4
2	Garfield or Natural Cross	23	39	87	2.9	29.3	45.2
3	Suprise	21	38	87	3.0	33.1	41.8
4	Canadian Velvet Chaff	21	35	81	2.9	31.4	43.0
5	Bonnell or Landreth	23	39	85	3.2	34.2	48.9
6	Seneca or Clawson	23	39	78	3.1	30.9	42.4
7	Standard	22	36	91	2.7	35.1	39.3
8	Early Red Clawson	20	37	91	2.7	26.4	48.3
9	Red Velvet Chaff	23	39	87	2.9	30.1	43.1
10	Jones' Winter Fyfe	22	38	83	2.8	34.1	39.6
11	Winter Pearl	24	40	78	3 7	30.5	49.7
12	Rogers	23	36	74	3.1	30.6	43.5
13	Egyptian	21	44	83	2.8	29.4	40.5
14	Martin Amber	23	38	78	3.3	37 4	47.2
15	Golden Cross or Volunteer	21	39	85	2.5	27.1	43.3
16	Manchester	22	37	73	2.8	28.8	41.1
17	Bulgarian	21	40	70	2.9	30.8	40.1
18	Red Lyon	21	38	70	2.5	22.6	44.2
19	Golden Drop	23	39	74	3.1	34.9	44.3
20	Hybrid Mediterranean	23	38	80	2.5	25.7	44.7
21	Lancaster	21	38	75	2.6	21.3	43.8
22	Democrat	22	40	72	2.7	27.2	40.1
23	New Monarch	22	37	80	3.2	32.2	41.4

From the foregoing table we learn that there were only four days of difference in the ripening of the 23 varieties. The greatest difference in the average length of the plant in the plots was only seven inches, and the average length of the plant in all the plots was 38.4 inches. The width of the straw is given in millimetres to give an idea of size and to some extent of its strength. As the straw in all the varieties stood fairly erect until the time of cutting, it would not be so easy perhaps to convey a correct idea in any other way. The average length of head was 2.9 inches, and the average number of grains per head was 30.1. From the column giving the weight in grammes of 1,000 grains of each variety, a somewhat accurate idea of the comparative size of the grains can be obtained.

The seed in 15 varieties was obtained from our own station and the balance as follows: Nos. 1, 8, 10 and 15 (Steele); Nos. 4 and 16 (Pearce); No. 11 (Wilkinson) and No. 13 (Gordon).

The color of the straw was white in all varieties, except Nos. 15 and 21, which were a deep slate, and Nos. 16, 18 and 20, which were a light slate.

The surface of chaff was smooth with the exception of the three velvet varieties, Nos. 4, 9 and 10.

TABLE XV. Yields of the 15 leading varieties for 1890 are given in comparison with the yields of the same for 1891.

Varieties.	Weight of grain per measured bushel.			Yield of grain per acre in bushels of 60 lb.		
	1891.	1890.	Average 1890-1.	1891.	1890.	Average. 1890-1.
Surprise	63.3	58.7	61.0	63.8	29.6	46.7
Red Velvet Chaff	64.0	61.0	62.5	56.9	35.8	46.3
Bonnell or Landreth	62.8	61.0	61.9	59.5	32.1	45.8
Early Red Clawson	62.5	58.0	60.3	58.3	32.1	45.2
Standard	63.5	59.3	61.4	58.3	31.7	45.0
Rogers	62.5	60.8	61.7	54.6	34.6	44.6
Seneca or Clawson	62.8	59.0	60.9	58.9	25.4	42.1
Martin Amber	61.0	62.5	61.8	50.4	32.5	41 5
Golden Gross or Volunteer	64.0	58.3	61.2	49.9	32.1	41.0
Manchester	64.5	61.0	62.8	47.7	30.4	39.1
Golden Drop	63.0	61.2	62.1	44 3	32.5	38.4
Lancaster	64.5	61.7	63.1	42.8	33.3	38.1
Hybrid Mediterranean	64.3	60.2	62.2	44.0	32.1	38.1
Red Lyon	64.0	60.0	62.0	44.5	29.2	36.9
New Monarch	63.5	56.7	60.1	40.8	20.0	30.4
Averages	63.3	60.0	61.7	51.6	30.9	41.3

It will be observed that the Surprise heads the list, while as has been already stated it ranks high as a milling wheat. The Red Velvet Chaff which stood first last year for yield and weight combined, is second in comparison for the two years, but drops down to ninth place in the list of 1891. It may also be observed that on the whole, the different varieties have given yields in much the same order for the two years. The average yield per acre for the two years, and the average weight per bushel, are certainly satisfactory. The former was no less than 43.1 bushels, and the latter 61.7 lb.

REPORT OF THE DOMINION MILLERS' ASSOCIATION.

A deputation was appointed by the Dominion Millers' Association to visit this station, examine the different kinds of winter wheat and report upon the same. The deputation consisted of ten persons, including the President and Secretary of the Association. The visit was made on August 5th and the following is a summary of the report:

"The Committee are anxious to extend the growth of white wheat. They think very highly of the Surprise variety and advise farmers to sow it. They highly recommend the Canadian Velvet Chaff and regard it as a good milling wheat. They also consider the Bulgarian an extra good milling wheat.

"In regard to the red varieties they advise that the Rogers should not be sown as it is inclined to smut and contains no good milling properties They also fear that the Manchester is a weak wheat for milling purposes, but this conclusion is only based on the grinding of small quantities. They consider the Jones' Winter Fyfe an extraordinarily good wheat for grinding, and they are of the opinion that if the farmers could raise it plentifully it would obviate the necessity of using so much Manitoba wheat. They very highly recommend the Hybrid Mediterranean, looking upon it as a good wheat, and they also highly recommend the Longberry Red."

Conclusions.

The results of the experiments may be thus summarised:

1. The splendid returns obtained in this experiment prove that the capabilities of Ontario, as a wheat producing country, are still of a high order.

2. The bald wheats have on an average given 9.86 bushels more per acre, or 21.42 per cent. than the bearded varieties, but the latter have weighed on an average 1.37 lb. more per bushel.

3. The white wheats have given an average of 5.18 bushels more per acre than the red wheats, and they also stand higher in the estimation of the millers than the latter.

4. The bald white chaff white wheats gave an average of 13.6 bushels per acre more than the bearded red chaff red wheats.

5. The seven leading varieties in point of yield were all white wheats except the American Bronze.

6. These experiments tend to confirm the popular opinion that white wheats under favorable conditions will give more bountiful returns than red wheats, and that the same may be said of the bald varieties as contrasted with the bearded.

7. The four best yielding white wheats for 1891 were the Garfield, Surprise, Canadian Velvet Chaff and Bonnell; and the four best yielding varieties of red wheat were the American Bronze, Early Red Clawson, Red Velvet Chaff and Jones' Winter Fyfe, in the order named in both instances.

8. The four best weighing varieties were the Manchester, Bulgarian, Lancaster and Democrat, each of which gave 64½ lb. per bushel.

9. The three velvet chaff varieties gave an average yield of 4.77 bushels per acre in excess of the mean average of the 23 varieties, and weighed .22 lb. more per bushel, and they are also included in the leading varieties mentioned in conclusion 7.

10. Of the varieties enumerated in this bulletin, the Dominion Millers' Association recommend the following as the most serviceable for milling purposes, viz.: of the white wheats, the Surprise, Canadian Velvet Chaff and Bulgarian; and of the red wheats, the Jones' Winter Fyfe, the Hybrid Mediterranean and the Longberry Red.

Distribution of Seed.

As we have received many enquiries regarding seed, we append the following in reference to the mode of distribution that we have decided to adopt: We will supply any of the following varieties, viz., the Surprise, Red Velvet Chaff, Bonnell or Landreth, Early Red Clawson, Bulgarian, Garfield, American Bronze, and Canadian Velvet Chaff in one bushel and half bushel lots. As we have only a limited quantity of the seed of each of these varieties, we can only furnish seed while the supply lasts and in the order in which we receive the applications. The prices charged will be moderate. For further information apply to the Professor of Agriculture.

The varieties will be distributed in smaller lots through the medium of the Ontario Agricultural and Experimental Union. The Experimental Union, which meets annually at the Agricultural College, is composed of the officers, ex-students and students of the college, and all farmers throughout the province are invited to co-operate in the work that is being carried on by the Association. This work consists of the testing of seeds and fertilisers, under conditions as nearly similar as can be found practicable. The seeds are furnished by the Union free to the farmers, and full instructions regarding the mode of conducting the tests are also furnished at the same time. The only return asked of the farmer is a report of the results, to be sent after harvest by a time fixed upon as mentioned in the instruction sheet. These reports are made upon blank forms furnished to each experimenter along with the instructions.

At the present time there are no less than 1,642 plots under experiment, which are conducted by ex-students and other farmers throughout the province. These plots comprise the following: 70 with fertilisers, 196 with lucerne and corn, 350 with roots, 1,026 with spring wheats.

The results of this work, which are published annually, cannot fail to be of immense service to the farmers.

In the subjoined table will be found the different sets of varieties of wheats, which will be furnished by mail in half pound lots of each variety, to farmers applying for them and in the order of the applications so long as the supply lasts.

Five Sets of Fall Wheat for Co-operative Tests.

(1)	(2)	(3)	(4)	(5)
American Bronze.	American Bronze.	American Bronze.	American Bronze.	American Bronze.
Canadian Velvet Chaff.	Canadian Velvet Chaff.	Canadian Velvet Chaff.	Canadian Velvet Chaff.	Canadian Velvet Chaff.
Surprise.	Garfield.	Bonnell.	Winter Pearl.	Longberry Red.
Manchester.	Golden Cross.	Early Red Clawson.	Red Velvet Chaff.	Jones' Winter Fyfe.
Bulgarian.	Standard.	Lancaster.	Hybrid Mediterranean.	Democrat.

Each farmer wishing one of these sets will please address the Secretary, C. A. Zavitz, Experiment Station, Guelph, *mentioning which set he desires*, and the grain, instructions for testing and blank forms on which to report will be forwarded to his address.

(7) Winter Wheat, Comparative Test of Foreign Varieties.

A number of foreign varieties of winter wheat have been grown for two years upon the experimental plots. We hesitate as yet to recommend them to Canadian growers because of their lack of hardiness. We may yet find a place for some of them. Generally speaking they are less subject to rust than the varieties now grown in Ontario.

The plots upon which these were grown were very similar in soil to those on which the Canadian sorts were grown and which have been described on a previous page, and they were the same in area. The seeding took place September 4th, 1890 and 1¾ bushels were sown per acre. The management generally was the same as was given to the Canadian sorts.

The first table gives the characteristics of 18 varieties which were imported in the spring of 1889 and the second table gives the yields per acre for 1891 and the average yields for the past two years.

TABLE XVI. Characteristics of nineteen varieties of imported winter wheats.

Varieties.	Variety obtained from.	Number of years growth reported upon.	Date of maturity.	Hardiness.	Length of plant.	Nature of head.	Color of wheat.
			August.				
Square Head	Germany	2	27	Medium.	38	Bald.	Red.
Dividend	Germany	2	......	Medium.	44	Bald.	Red.
Russian Odessa	Russia	2	25	Medium.	37	Bald.	White.
Golden Drop Red	England	2	28	Medium.	34	Bald.	Red.
Herefordshire White	England	2	27	Medium.	39	Bald.	White.
Spalding Red	England	2	26	Medium.	39	Baid.	Red.
Lamed Hybrid	France	2	28	Medium.	37	Bald.	Red.
Square Head	England	2	27	Medium.	37	Bald.	White.
White Petenelle	France	2	26	Medium.	39	Bald.	Red.
Galezien Summer	Germany	2	25	Medium.	39	Bald.	Red.
Lammas Red	England	2	27	Medium.	40	Bald.	Red.
Browick Red	England	2	27	Medium.	39	Bald.	Red.
Kessingland Red	England	2	28	Poor.	38	Bald.	Red.
Saumur	France	2	28	Poor.	39	Bald.	Red.
Red Inversible	France	2	27	Poor.	37	Bald.	Red.
Regent	Germany	1	27	Good.	38	Bald.	White.
Imperial Velvet Chaff	England	1	....	Poor.	37	Bald.	Red.
Miracle	Germany	1	....	Medium.	....	Bald.	White.

Many of these varieties are possessed of characteristics which are highly desirable, ch as freedom from rust, strength of straw and quality of grain, but their lack of ability endure our winters and lateness of ripening seem to give them a second place to nearly l our Ontario varieties. When these become better acclimatized they will probably give sults more satisfactory in many respects. The Galezien Summer and the Miracle stand gh in the estimation of the millers, the former for its strength and the latter for its lor.

TABLE XVII. Comparative yields of eighteen varieties of new winter wheats for one and two years.

Varieties.	Weight per measured bush.		Yield of straw per acre.		Yield of grain per acre.—(bush. 60 lb.)	
	1891.	Average 1890-91.	1891.	Average 1890-91.	1891.	Average 1890-91.
Square Head	60½	59	1.61	1.99	38.13	35.11
Dividend	60¾	56⅞	1.94	2.56	46.67	35.10
Russian Odessa	63⅛	61⅜	1.34	1.70	39.17	33.70
Golden Drop Red	60¼	59¼	1.11	1.24	41.41	31.30
Herefordshire White	60¾	59⅛	1.46	1.61	37.71	30.52
Spalding Red	59¾	59⅛	1.75	1.54	42.08	29.58
Lamed Hybrid	59½	59½	1.21	1.50	28.96	27.61
Square Head	64¼	60⅛	1.69	1.42	37.50	26.67
White Patenelle	58¾	58⅜	1.24	1.36	32.50	25.21
Galezien Summer	62¾	62¾	.64	1.34	15.42	23.96
Lammas Red	60½	59½	.95	1.35	27.88	23.94
Browick Red	60¼	58¾	1.40	1.38	35.42	23.13
Kessingland Red	60⅛	56½	....	....	38.54	21.77
Saumur	60	58¾	1.04	1.21	27.50	20.83
Red Inversible	60¾	60	.76	1.04	20.00	16.88
Regent	60½	....	1.36	....	36.25	....
Imperial Velvet Chaff	59½	....	1.13	....	31.88	....
Miracle	61½	....	.88	....	20.62	....
Average	60.7	59.3	1.26	1.52	33.2	27.0

Some of the yields it will be observed are not discouraging, although they are quite hind those obtained from Canadian and American kinds. The Galezien Summer which omised so favorably in 1890 did not maintain its reputation for production and hardiss in 1891.

(8) OATS. COMPARATIVE TESTS OF VARIETIES.

The report on Oats contains three tables. The first gives the characteristics of 108 varieties grown during the present year; the second the comparative yields of 81 varieties grown side by side for three years; the third the comparative yields of 27 varieties grown for one year only. The plots were each 100 links long and 10 links broad. Each plot therefore contained one one-hundredth of an acre. All the varieties grown this year were sown April 29th. The seed was sown broadcast at the rate of 2¼ bus. per acre.

TABLE XVIII. Characteristics of one hundred and eight varieties of Oats.

Varieties.	Variety obtained from	Number of years' growth reported upon.	Date of maturity.	Length of plant.	Nature of head.	Color of grain.
				in.		
1 Joanette Black	France	3	Aug. 11	41	Spreading	Black
2 Chenailles Black	France	3	" 11	41	"	"
3 Black Etampes	France	3	" 11	36	"	"
4 Houdan Black	France	3	" 12	34	"	"
5 Siberian	Russia	3	" 7	49	"	White
6 Danebrog	Germany	3	" 19	48	"	"
7 White Canadian	Germany	3	" 19	48	"	"
8 Poland White	France	3	" 5	45	"	"
9 Improved Besthorn	Germany	3	" 17	45	"	Yellow
10 Siberian	France	3	" 5	41	"	White
11 Egyptian	Ontario	3	" 17	49	"	"
12 Pringle's Progress	Ontario	3	" 14	43	"	"
13 Georgian	Germany	3	" 16	45	"	"
14 Oderbrucker	Germany	3	" 17	39	"	"
15 Probsteier	Germany	3	" 17	47	"	"
16 Waterloo	Germany	3	" 17	46	"	"
17 Black Poland	Scotland	3	" 19	50	Mane	Black
18 White Abundance	France	3	" 19	39	Spreading	White
19 Georgian White	France	3	" 15	42	"	"
20 White Tartarian	Russia	3	" 20	49	"	"
21 Bavarian	Ontario	3	" 12	41	"	"
22 Acclimatized Black Tartarian	Ontario	3	" 16	46	Mane	Black
23 Black Hungarian	France	3	" 18	48	"	"
24 Flying Scotchman	England	3		45	Spreading	White
25 Black Tartarian	Scotland	3	" 19	49	"	"
26 Nubian Black	Germany	3	" 18	49	Mane	Black
27 Yellow Gigantic	France	3	" 19	45	"	Yellow
28 Victoria White	Scotland	3	" 13	50	Spreading	White
29 Black Champion	Ontario	3	" 13	44	Mane	Black
30 Potato	New Zealand	3	" 5	49	Spreading	White
31 White Tartarian	Scotland	3	" 23	52	Mane	"
32 Yellow August	Germany	3	" 25	47	Spreading	Yellow
33 California White	Germany	3	" 21	50	Mane	White
34 Improved Waterloo White	England	3			Spreading	"
35 Cluster, or Triumph	Ontario	3	" 5	46	"	"
36 Rosedale	Ontario	3	" 17	49	Mane	"
37 August White	Germany	3	" 18	48	Spreading	"
38 Pedigreed Black Tartarian	Ontario	3	" 14	46	Mane	Black
39 Black Red Crown	France	3	" 21	36	Spreading	"
40 Early Blossom	England	3	" 5	46	"	White
41 Black Tartarian	Ontario	3	" 14	41	Mane	"
42 Hopetown	Ontario	3	" 14	43	Spreading	"
43 Podolischer	Russia	3	......	......	"	"
44 Carter's Prize Cluster	Ontario	3	" 5	47	"	"
45 American Welcome	Germany	3	" 7	48	"	"
46 Colommiers	France	3		47	"	Black
47 White	Australia	3	" 4	45	"	White
48 White Hungarian	France	3	" 17	48	Mane	"
49 Welcome	Ontario	3	" 6	44	Spreading	"
50 Providence	Sweden	3	" 19	47	"	"
51 Brie Black	France	3	" 26	41	"	Black
52 Dun	New Zealand	3	" 21	43	"	Dun
53 Dutch Bren	England	3	" 4	43	"	White
54 Bertram's Prolific	Scotland	3	" 19	51	"	"

TABLE XVIII. Characteristics of one hundred and eight varieties of Oats.—*Continued.*

Varieties.	Variety obtained from	Number of years' growth reported upon.	Date of maturity.	Length of plant.	Nature of head.	Color of grain.
				ins.		
55 White Poland	Russia	3	Aug. 17	49	Spreading	White
56 Victoria Prize White	England	3	" 5	44	"	"
57 Round, or branching Black	France	3	" 21	46	"	Black
58 Rennie's Prize White	Ontario	3	" 5	48	"	White
59 Hamilton	Scotland	3	" 20	49	"	"
60 Thurigen	Germany	3		43	"	Yellow
61 Longfellow	Germany	3	" 23	50	"	White
62 Scotch Potato	Russia	3	" 21	48	"	"
63 Dun	Scotland	3	" 13	50	"	"
64 Flander's White	France	3	" 14	42	"	"
65 Yellow Flanders	France	3	" 15	43	"	Yellow
66 Longfellow	Scotland	3	" 19	46	"	White
67 Racehorse	Ontario	3	" 4	40	"	"
68 Birlie	Scotland	3	" 19	47	"	"
69 Early Racehorse	England	3	" 5	42	"	"
70 Prolific Black	California	3	" 17	45	Mane	Black
71 Potato	Scotland	3	" 17	45	Spreading	White
72 Port Adelaide	Australia	3		47	"	"
73 Angus	Scotland	3	" 19	45	"	"
74 Improved Scotch	Ontario	3	" 15	43	"	"
75 Triumph	Australia	3	" 19	47	"	"
76 Australian White	Australia	3	" 18	41	"	"
77 Hopetown	Germany	3	" 23	47	"	"
78 Hopetown	Scotland	3	" 20	46	"	"
79 Red Spot	France	3	" 15	50	Mane	Dun
80 Hungarian Black	Hungary	3	" 18	47	Spreading	Black
81 Selected Winter	England	3		46	....	Dun
82 Magnet	Ontario	1	" 13	45	....	White
83 Golden Giant	Ontario	1	" 19	43	....	Yellow
84 White Mane	Ontario	1	" 12	45	....	White
85 Holstein Prolific	Ontario	1	" 12	45	....	"
86 White Schonen	Ontario	1	" 15	43	....	"
87 Vick's American Banner	United States	1		....	....	"
88 Giant Yellow	....	1	" 12	45	....	Yellow
89 Danish	New Zealand..	1	" 13	42	....	White
90 Giant Swedish	Ontario	1	" 18	43	....	Yellow
91 Wide Awake	Ontario	1	" 12	43	....	White
92 Early Gothland	Ontario	1	" 15	....	....	"
93 Black Mane	Ontario	1	" 14	45	....	Black
94 Early Archangel	Ontario	1	" 5	44	....	White
95 Black Glen Rothern	Ontario	1	" 20	44	....	Black
96 Early Calder	Ontario	1	" 12	43	....	White
97 White Swiss	....	1	" 11	45	....	"
98 New Rosedale White	Ontario	1	" 12	46	....	"
99 White Belgian	....	1	" 4	44	....	"
100 Japan	United States	1	" 5	45	....	"
101 Canadian Triumph	Ontario	1	" 6	45	....	"
102 Clydesdale	Ontario	1		....	....	"
103 Carter's Early Black	England	1	" 23	41	....	Black
104 Steele's New White Cave	Ontario	1	" 12	46	....	White
105 Dakota	United States	1	" 4	46	....	"
106 Victoria Prize White	England	1		44	....	"
107 Rennie's Prize White	Ontario	1	" 11	43	....	"
108 Carter's Royal Cluster	England	1	" 15	46	....	"

It may be mentioned here that the nine leading varieties grown for three years are all foreign. The highest yielding variety of the 15 old Canadian sorts is the

Egyptian. The Joanette Black, Chenailles Black, Black Etampes and Houdan Black, are all very much alike in all essential characteristics, so much so that the three first mentioned appear to be one and the same variety, though probably grown for some time past in different localities in France. The straw is strong, and if anything under medium in height. These varieties are therefore more suitable for sowing on good rich land. They stand up exceptionally well, are not coarse and are almost entirely free from rust. They are also inclined to shell easily when ripe, and also to hull considerably when threshed. The last mentioned feature may be considered characteristic of any good variety. The Siberian, imported from Russia, is one of the earliest maturing varieties. It is a strong grower and stands up well.

TABLE XIX. Comparative yields of eighty-one varieties of oats for three years.

Varieties.	Weight per measur'd bush.		Straw per acre.		Grain per acre (bush. 34 lb).	
	1891.	Average. 1890-91.	1891.	Average 1889-91.	1891.	Average. 1889-91.
	lb.	lb.	tons.	tons.	bush.	bush.
1 Joanette Black	37	35.75	2.8	2.7	112.1	85.2
2 Chenailles Black ..	37¼	35.93	2.8	2.8	109.6	81.0
3 Black Etampes........	36¼	36.50	2.5	2.5	105.1	79.9
4 Houdan Black.... ...	35¼	35.25	2.0	2.0	98.2	78.8
5 Siberian....	35⅗	37.80	2.5	2.5	115.1	77.8
6 Danebrog	36¼	34.13	2.0	2.4	104.0	77.3
7 White Canadian	34½	34.00	2.4	2.7	110.7	77.1
8 Poland White	37¾	40.12	2.7	2.2	118.0	75.9
9 Improved Besthorn .	38¾	35.50	2.0	1.9	100.4	74.6
10 Siberian	39¾	37.25	2.0	2.1	96.7	74.6
11 Egyptian	38⅓	38.00	2.7	2.9	107.0	74.4
12 Pringle's Progress	31¼	30.12	1.9	2.4	98.9	74.1
13 Georgian	35⅓	34.56	2.2	2.7	98.9	73.4
14 Oderbrucker...... ...	31¾	31.63	2.7	2.4	84.9	72.7
15 Probsteier	37¼	35.25	1.9	2.3	94.5	72.7
16 Waterloo	37¼	34 29	1.7	2.3	96.7	72.7
17 Black Poland	34¾	35.00	2 7	2.6	112.1	72.4
18 White Abundance	37¼	36.25	2.0	2.4	97.4	71.7
19 Georgian White	35¼	34.87	2.0	2.5	101.8	71.4
20 White Tartarian	36	35.68	3.6	3.2	97.4	70.7
21 Bavarian	36¼	34.62	1.9	2.5	94.5	70.5
22 Acclimatized Black Tartarian	33	31.62	2.3	2.4	100.4	69.3
23 Black Hungarian	33	33.25	2.6	2.8	113.6	68.8
24 Flying Scotchman....	41½	40.25	1.9	2.2	88.6	68.2
25 Black Tartarian.....	36½	35.55	2.3	2.8	98.5	68.1
26 Nubian Black	34	33.0	2.5	2.7	103.3	67.8
27 Yellow Gigantic......	32¾	30.12	2.2	2.6	100.4	67.8
28 Victoria White........	42	42.25	2.4	2.4	92.3	66.3
29 Black Champion......	35	31·75	2.1	2.4	94.5	66.3
30 Potato................	41¾	39.87	2.2	2.4	100.7	65.6
31 White Tartarian.....	30	30.06	3.6	3.6	108.5	65.3
32 Yellow August	33¼	31.56	2.9	3.2	104.7	63.8
33 California White	36¼	34.13	2.5	2.7	97.4	62.9
34 Improved Waterloo White	37	33.25	1.6	1.9	92.3	62.9
35 Cluster (or) Triumph .	43¾	40.37	2.0	2.2	88.6	62.6
36 Rosedale	38¼	38.37	2.4	2.9	105.5	62.1
37 August White........	41	40.75	2.6	2.9	100.4	61.7
38 Pedigreed B. Tartarian	34¼	37 75	2.1	2.3	88.6	61.6
39 Black Red Crown	34	32.75	2.4	2.3	100.4	61.4
40 Early Blossom........	42¼	39 37	1 7	2.2	79.0	61.4
41 Black Tartarian	34¾	33.50	1.8	2.0	91.9	61.2
42 Hopetown...........	36½	34.87	2.0	2.5	99.6	61.1
43 Podolischer	41½	40.37	2.2	2.6	100.4	60.7

TABLE XIX. Comparative yields of eighty-one varieties of oats for three years.—*Continued.*

Varieties.	Weight per measur'd bush		Straw per acre.		Grain per acre (bush 34 lb.)	
	1891.	Average 1890-91.	1891.	Average 1889-91.	1891.	Average 1889-91.
	lb.	lb.	tons.	tons.	bush.	bush.
44 Carter's Prize Cluster..	43	41.66	2.2	2.1	93.0	60.4
45 American Welcome....	42¼	41.21	2.1	2.3	85.7	60.4
46 Colommier's	36¼	32.69	3.1	3.3	102.6	59.9
47 White.	42½	41.50	1.8	2.1	90.8	59.7
48 White Hungarian	36¾	34.62	2.4	2.7	92.3	59.2
49 Welcome	42	39 50	1.8	2.1	81.3	59 0
50 Providence	36¾	36.13	3.1	2.8	101.1	59.0
51 Brie Black............	35½	32.50	2.9	3.2	98.9	58.2
52 Dun	35¾	33.12	2.4	2.5	79.0	58.2
53 Dutch Bren	43¼	39.87	1.9	2.1	79.8	58.0
54 Bertram Prolific	37	36 06	3.4	3.1	95.2	58.0
55 White Poland	37¼	35.87	2.7	2.6	90.1	57.7
56 Victoria Prize White..	41¼	41.13	1.6	1.8	81.0	57.4
57 Round or Brauching Black	35¾	32.13	2.8	2.7	103.3	56.9
58 Rennie's Prize White..	43	41.00	2.0	2.3	76.8	56.5
59 Hamilton	37¾	36.87	3.1	3 0	102.6	56.5
60 Thurigen	32	31.75	2.4	3.0	95.1	55.6
61 Longfellow	38¼	36.62	2.8	2.9	94.5	55.3
62 Scotch Potato	36¼	35.25	3.4	2.7	112.1	54.8
63 Dun..................	36½	34.25	3.7	3 6	90.8	53.8
64 Flander's White	36¾	25.62	1.8	2.2	96.3	53.7
65 Yellow Flanders	36	32.93	2.3	2.8	93.8	52.8
66 Longfellow	37¼	34.44	1.9	2.9	106.2	52.6
67 Racehorse............	39¾	39.87	1.7	1.9	76.1	52.3
68 Birlie	38¼	38.13	3.0	2.7	89.3	52.1
69 Early Racehorse	42¾	41.62	1.8	1.8	85 7	51.9
70 Prolific Black	33¼	31.87	2.0	2.2	87.9	51.9
71 Potato	38	34.75	3.2	2.7	102.6	51.1
72 Port Adelaide	42¼	40.87	2.0	2.1	87.1	49.9
73 Angus	36½	36.00	2.6	2.5	79.8	48.9
74 Improved Scotch......	37¾	33.87	2.5	2.7	94.5	47 9
75 Triumph	35¼	31.12	2.2	2 3	93.0	46.7
76 Australian White	41	39.12	2.0	2.2	88.6	46.7
77 Hopetown.......... ..	36	34.56	3.0	3.0	78.3	46.4
78 Hopetown............	37	35.25	2.7	3.2	79.0	46.1
79 Red Spot	33¼	30.37	2.9	2.6	69.5	43.8
80 Hungarian Black......	31¾	31.44	1.9	1 9	70.6	43.6
81 Selected Winter	36¾	34.50	2.2	2.3	55.5	35.9
Average.....	37.1	35.76	2.3	2.5	95.0	62.0

The four varieties which give the best yields are black oats and the four next to them are white. Among the highest yielding varieties the Poland White weighs considerably the best. It will also be observed that of the 81 varieties in the above table 68 have a spreading head and 13 varieties have a side head. The 16 varieties standing first in point of yield possess the spreading head. In our experience in growing oats we have found an unusually large number among the imported varieties which promise well for the future. The difference between the yields of grain relatively appears to be much greater than the difference between the straw product of the corresponding varieties.

The following table gives the yields of the remaining 27 varieties grown only in 1891. The yields per acre of all the varieties of oats grown are unusually high this year. The Magnet, the variety giving the highest yield is a white oat, a good strong grower, and is medium as to maturing. The 11 varieties giving the highest yields are white or yellow. Among the earlier varieties are the Early Archangel, Japan and White Belgium.

TABLE XX. Yields of twenty-seven varieties of Oats for one year only.

Varieties.	Weight per measured bush. 1891.	Weight of straw per acre 1891.	Yield of grain per acre. 1891.
	lb.	tons.	bush.
82 Magnet	36	2.4	120.2
83 Golden Giant	30¾	2.4	115.8
84 White Mane	35¼	2.3	109.2
85 Holstein Prolific	36½	2.0	109.2
86 White Schonen	34½	2.2	106.6
87 Vick's American Banner	37	2.0	105.9
88 Giant Yellow	35	2.3	103.3
89 Danish	36	2.1	101.8
90 Giant Swedish	31¼	2.1	99 6
91 Wide-a Wake	35¾	2.0	98.9
92 Early Gothland	38¼	1.9	95.0
93 Black Mane	34¾	2.2	92.3
94 Early Archangel	40	2.3	91.5
95 Black Glen Rothern	36½	2.5	91.5
96 Early Calder	34¾	2.0	90.8
97 White Swiss	38	2.2	90.8
98 New Rosedale White	39¾	2.2	89.3
99 White Belgian	39	2.1	83.5
100 Japan	42	1.6	83.5
101 Canadian Triumph	42¼	1.6	83 1
102 Clydesdale	37½	2.3	82.0
103 Carter's Early Black	30¾		76.8
104 Steele's New White Cave	39½	1.7	73.9
105 Dakota	41¾	3.6	71.9
106 Victoria Prize White		1.9	70.2
107 Rennie's Prize White	41¾	1.6	67.6
108 Carter's Royal Cluster	38	2.0	64.3
Average	37.02	2.2	91.3

(9) OATS, DIFFERENT DATES OF SEEDING.

This experiment was carried on simultaneously with others made with barley and spring wheat to ascertain the difference in the returns obtained from growing grain sown at different periods. The figures in the table below represent the average yield of two plots in every instance. The plots were 60 x 10 links as in the case of the other grains mentioned. The grain was sown at the rate of 75 lb. per acre.

TABLE XXI. Oats, different dates of seeding.

Dates of Seeding.	Weight per measured bushel.	Amount of straw per acre.	Yield of grain per acre.
	lb.	tons.	bush.
April 22nd	35.7	1.54	58.2
May 1st	36.2	1.47	68.0
May 9th	34.1	1.66	64.9
May 18th	32.4	1 53	49.7
May 26th	28.5	1.78	33.3
June 6th	24.9	2.00	23.4
Average	32.0	1.66	49.6

It will be observed that the return of grain from the first sown plots was less than from that sown nine days later, the weight per bushel was also somewhat less. The yield of straw, however, was more with the plots which were sown late.

(10) BARLEY, SPRING WHEAT AND OATS SOWN SEPARATELY AND IN MIXTURES.

The question has been raised by farmers as to whether a larger yield of grain or straw or of both can be obtained by sowing grains separately or mixed. In the hope of throwing some light on this question, 16 plots were sown with barley, peas, spring wheat and oats, separately and also in various combinations. The peas proved a failure owing to dry weather, therefore the plots of mixed grains containing peas had to be left unreported. The plots contained each one one-hundredth of an acre. The seeding took place on May 13th. When sown singly the following amounts of seed were used per acre: Oats 75 lb., barley 100 lb., spring wheat 120 lb., and in mixtures two-thirds of each of these amounts of each class of grain sown were used.

TABLE XXII. Barley, Spring Wheat and Oats sown Singly and in Mixtures.

Grains.	Weight per acre sown separately.	Weight per acre mixed grains.	Weight of straw sown separately.	Weight of straw of mixed plots.
	lb.	lb.	tons.	tons.
Oats and Barley	2,575	3,725	1.84	2.35
Wheat and Oats	2,162	3,200	2.11	2.26
Barley and Wheat	1,762	2,300	1.56	1.70
Oats, Wheat and Barley	2,166	3,025	1.80	2.08

It will be observed that in every instance the yields from the kinds sown mixed both of grain and straw are considerably in advance of those secured by sowing them separately.

(*b*) *Cereals in Large Plots.* These are grown with the object of obtaining seed of promising varieties in quantities sufficient for a more general distribution through the country. They more generally consist of varieties that have been previously tested for two years. They cover an area of one-third of an acre to two acres, owing to the quantity of the seed on hand. The whole area of spring grains covered by these plots was 46 acres. The two fields on which they were grown are known as Nos. 1 and 16 respectively. Field No. 1 was plowed out of sod in the autumn of 1889 and produced a crop of rye for fodder and also one of rape the following year. The rape was pastured off with lambs. No manure was applied. Field No. 16 was plowed out of sod in the autumn of 1888. A crop of oats and peas was grown the following year. A crop of rye and also one of rape, both of which were pastured, were grown in 1890 No manure was applied. As the fertility of the soil in field No. 1 exceeded that of field No. 16 no comparison can be drawn between plots of the same kinds of ground, equal in size, growing in these two fields. The size of each plot in field No. 1 was one-third of an acre.

TABLE XXIII. 11) Large plots of Barley grown in Field No. 1.

Barleys.	Yield of grain per acre.
	bush.
Improved Cheyne	36.00
Mandscheuri	65.56
Chevalier	51.69
Oderbrucker	51.69
Hallett's Pedigree	50.81
Cape	41.44

These varieties were sown 29th April. The Mandscheuri, which stands first in the small plots for three years, is also first in the large plots. The Chevalier, Oderbrucker and Hallett's Pedigree stand about the same relatively as in the small plots. The Improved Cheyne, imported from Germany and which promised so well for two years, has not done nearly so well, relatively, this year in either the large or small plots.

TABLE XXIV. Large plots of Barley grown in Field No. 16.

Barleys.	Acres.	Grain per acre.
		bush.
Oderbrucker	2⅔ acres.	31.19
Cheyne	2 "	22.75
Kalina	2 "	22.81
Phœnix	2 "	23.33
Improved Scotch	1 "	24.41
Chevalier	1 "	21.35
Cape	1 "	18.63

The varieties of barley in field No. 16 were not sown until May 6th, 7th and 8th. As this field had received no manure for several years the yields are only moderate.

TABLE XXV. (12) Large plots of Peas grown in Field No. 1.

Peas.	Yield of grain per acre.
	bush.
Striped Wisconsin Blue	26.25
Prince Albert	32.25
White Dwarf Marrowfat	32.90
Canada Cluster	37.90
Cleveland's Alaska	12.00
Cleveland's Royal New Yorker	11.50

The seed of all these varieties was presented to this department by the Cleveland Seed Co., Picton, Ont. They were sown with the drill April 29th. It will be noticed that some of these yields are large. As the peas in the small plots were sown about the same time and failed to germinate, we can see the benefits arising from sowing peas with the drill in a dry season.

TABLE XXVI. Large plots of Peas grown in Field No. 16.

Peas.	Acres.	Grain per acre, bush.
Brown Pea	⅔ acre	24.50
Field Pea	6/9 "	15.90
White Wonder	5/9 "	16.50
Cleveland Advancer	⅓ "	27.75
Tall White Marrowfat	⅓ "	31.75
Blue Pea	⅔ "	10.12½

The peas in field No. 16 were sown May 8th and 9th The returns were relatively higher than in the case of the barleys grown in the same field. Wou'd not this seem to indicate that peas do not require soil so fertile relatively as barley? The first three varieties and also the last mentioned are from New Zealand, and the other varieties from the Cleveland Seed Co., Picton, Ont.

TABLE XXVII. (13) Large plots of Spring Wheat grown in Field No. 1.

Spring Wheat.	Yield of Grain per acre.
	bush.
Rio Grande	19.55
Holben's Improved	24.45
Manitoulin	24.85
Red Fern	25.45
Herison Bearded	15.50
Pringle's Champion	18.80

These plots were sown April 30th, 1891. The drill was used. The quantity of grain sown of the Herison Bearded and Pringle's Champion varieties was considerably less than the amount of seed usually sown owing to a shortage in the supply, and this in part at least explains the reason of the low yields. The Red Fern standing first in the above list in point of yield, stands first also in the small plots of the 21 varieties grown for two years only.

TABLE XXVIII. (14) Large plots of Oats grown in Field No. 1.

Oats.	Yield of Grain per acre.
	bush.
White Bonanza	55.15
Siberian	98.21
Probsteier	101.47
White Poland	76.50
White Tartarian	87.79
Joanette	75.91

These grains were sown April 29th and 30th, 1891. The Probsteier standing first in point of yield, has fourteenth place among 81 varieties grown for three years. The White Bonanza is an early variety which does not seem very well adapted to the soil of this farm. It was not sown in the small plots owing to some oversight. It is further referred to in the Union report. The Siberian, second in the above list, comes fifth in point of yield of the varieties grown for three years.

TABLE XXIX. Large plots of Oats grown in Field No. 16..

Oats.	Acres.	Grain per acre.
		bush.
White Bonanza	2 acres	50.30
Poland White	2 "	62.91
Banner	1 "	63.44
Joanette	$1\frac{5}{8}$ "	79.40
Oderbrucker	2 "	66.60
White Abundance	1 "	61.29

These grains were sown 8th, 9th and 10th May, 1891. The Joanette, which comes first, also stands first among the 81 varieties grown for three years. Vick's American Banner which comes third in point of yield, has sixth place among the 29 varieties grown for one year only.

2. POTATOES AND ROOTS.

Of potatoes, 74 varieties were grown and of roots, 115 varieties. The roots include 42 varieties of Swede turnips, 15 varieties of fall or white and yellow fleshed turnips, 36 varieties of mangels, 18 varieties of carrots and 4 varieties of sugar beets. The seed potatoes were obtained from the United States, the Maritime provinces and Ontario. The seed of the roots was obtained principally from the United States, but that a few varieties came from England. Some of these have been tested here for two years. In composition the soil where the potatoes were grown was a clay loam containing a considerable amount of vegetable matter. The aspect was low lying. It was plowed out of sod six years old in the autumn of 1890, and was thoroughly cultivated in the spring. The drills were made with a double mould board plow.

The roots were grown upon a clay loam somewhat elevated. The ground grew a crop of oats in 1889. In the spring of 1890 manure was applied at the rate of 15 loads per acre. This was followed by a crop of rape which was fed off. The cultivation for both crops was such as is ordinarily given.

(15) Potatoes, Comparative Test of Varieties.

In 1891, 74 varieties of potatoes were grown. One drill of each was planted 11 rods long. The drills were 28⅙ inches apart. One peck of seed cut into 180 pieces was planted in each drill. The cut tubers were therefore one foot apart. The soil was sod six years old. Many of the varieties imported in the spring did not start well, hence we considered it prudent to report on but 16 varieties, the seed of which started most satisfactorily.

The first table gives the characteristics and yields of 25 varieties grown for two years; the second table those of the 16 varieties referred to above.

Table xxx. Characteristics and yields of twenty-five varieties of Potatoes for two years.

Variety.	Sprouting of seed after planting.	Maturity.	Size and uniformity of tubers.	Keeping quality of potatoes in cellar.	Yield per acre.	
					1891	Average 1890-91
					bush	
1 Empire State	Good	Medium	Good	Poor	223.9	192.9
2 Summit	"	Late	"	"	157.5	117.3
3 Early Mane	Medium	Early	Medium	Medium	145.0	140.9
4 Clark's No. 1	"	Medium	Good	Poor	138.7	138.0
5 Pootaluck	"	"	"	Medium	154.0	130.3
6 Thorburn	"	"	"	"	96.3	129.2
7 Rural New Yorker	Good	Early	Poor	Poor	126.0	127.5
8 London	Medium	"	"	Medium	112.9	124.3
9 The Daisy	Poor	"	Good	Good	78.1	117.8
10 Sweet St. Vernal	Good	Late	Medium	"	147.7	117.8
11 Late Rose	"	Medium	Good	"	138.3	116.4
12 Beauty of Hebron	Medium	Early	"	Medium	123.5	111.2
13 Rural Blush	Good	Late	"	Good	117.1	109.9
14 Minister	"	"	"	Medium	141.7	106.1
15 Early Sunrise	"	Early	Medium	Good	120.9	95.2
16 Halton's Seedling	Poor	"	Good	"	89.1	91.9
17 Early Puritan	"	"	"	"	27.2	83.3
18 Green Mountain	Medium	Medium	"	"	84.4	81.8
19 Dakota Red	Poor	"	"	"	83.2	80.3
20 White Elephant	Medium	Late	"	Poor	93.3	80.2
21 Rose's New Invincible	"	Medium	"	Medium	73.0	75.5
22 Rosy Morn	"	Early	"	Poor	63.7	70.7
23 Early Ohio	Poor	"	"	Medium	95.0	70.4
24 Stray Beauty	Medium	"	"	Good	77.2	63.1
25 Crown Jewel	Poor	"	"	Medium	72.8	51.8
Average					111.2	106.1

By actual test we have found that the six varieties giving the highest yields all possess good edible qualities with the exception of the Pootaluck which should not be classed higher than medium. Of these varieties the 1st, 2nd, and 4th named do not appear to keep so well as the others. We feel that we require further experimenting with potatoes before any thoroughly reliable conclusions can be drawn.

TABLE XXXI. Characteristics and yields of sixteen varieties of Potatoes for one year only.

Variety.	Where seed was obtained.	Maturity.	Size and uniformity of tubers.	Keeping quality of potatoes in cellar.	Yield per acre 1891.
Badger State	Ont	Medium	Good	Medium.	161.7
Convoy	"	Late	"	"	150.2
Advance	U.S.	Early	Medium	"	115.0
Kosh Konong	"	Medium	Good	Good	113.3
Putnam	"	Late	"	"	99.7
Tonhocks	"	Early	Poor	Medium	93.3
Early Rose	Ont	"	Medium	"	91.7
Early Oxford	U.S.	Medium	Poor	Good	90.4
Early Rochester	"	Early	Medium	"	85.7
Silver King	"	"	Poor	Medium	78.1
Thunderbolt	"	Medium.	Medium	"	74.3
Early Dominion		Early	Poor	Good	73.0
Ohio Junior	Ont	Late	Medium	"	69.6
Queen of the Valley	"	"	"	Medium	67.5
Woodbury White	U.S.	Early	"	Good	64.5
Hoffman	"	Medium	Poor	Poor	61.1
Average					93.7

The yields in the above table cannot be said to be satisfactory and therefore very much reliance should not be put upon them as guides in the selection of varieties for planting. Further experimenting will doubtless change these conclusions.

(16) POTATOES, DIFFERENT DEPTHS OF PLANTING SEED TUBERS.

This experiment was undertaken to test the results from planting at different depths. Eight plots were planted, each composed of one row 11 rods long. The rows were $28\frac{1}{6}$ inches apart. The tubers in four of the rows were covered to the depth of 1, 3, 5 and 7 inches respectively, and the next four rows were duplicates of these. They were planted on June 2nd and were covered with the hoe. The tubers used were cut into 180 pieces, as in the other experiments.

TABLE XXXII. Comparative yields of Potatoes from different depths of planting.

Depth of planting.	Average yield per acre of two plots.
	Bushels.
1 inch	160.7
3 inches	188.4
5 inches	224.2
7 inches	256.1

This experiment would tend to show that the depth to which the seed is covered has an important bearing on the yield of the crop. It cannot be said that this table indicates the best depth at which to plant the potatoes as those planted the deepest gave the best yield. The nature of the season will doubtless exercise an important influence on experiments such as this.

(17) SWEDE TURNIPS.—COMPARATIVE TEST OF VARIETIES.

In 1891, 42 varieties of Swede turnips were grown. The seed was obtained from the United States and Ontario with the exception of two varieties obtained from England. Each plot consisted of two drills 6 rods long, and the rows were 27.2 inches apart. The different plots were separated by the same distances. In one drill the plants were thinned to the distance of 12 inches and in the other to 16 inches. They were sown June 19th in drills made with the double mould board plow. The first table gives the characteristics and yields of 42 varieties, and the second the yields of the best 10 varieties for two years, viz., 1890-91.

TABLE XXXIII.—Comparative yields per acre of forty-two varieties of Swede Turnips grown in 1891.

Varieties.	Seed obtained from.	Description of roots.		Average weight per root.		Average weight per root of two seedings.	Yield per acre.		Average yield per acre.
		Shape.	Firmness of flesh.	Thin seeding.	Thick seeding.		Thin seed ing.	Thick seeding.	
				lb.	lb.	lb.	tons.	tons.	ton
Hartley Bronze Top	Ont.	Long	Good	3.2	2.7	2.91	23.0	24.9	23.93
Marshall's Purple Top	Ont.	Globe	Good	3.1	2.7	2.91	21.4	26.1	23.77
Sutton's Champion	Ont.	Globe	Medium	3.1	2.8	2.95	22.1	25.0	23.54
Hazard's Swede Turnip	Ont.	Long	Good	3.3	2.5	2.91	22.5	23.8	23.12
Our Selected Purple Top	Ont.	Long	Poor	3.1	2.7	2.89	21.7	24.2	22.95
Skirving's Swede	Ont.	Globe	Good	3.1	2.5	2.76	21.6	23.8	22.73
King of Swedes	Ont.	Globe	Medium	3.2	2.6	2.87	21.6	23.1	22.35
Sharp's Improved	Ont.	Globe	Poor	3.1	2.3	2.67	21.7	22.6	22,15
Royal Norfolk, P.T	Ont.	Long	Extra	2.9	2.6	2.71	20.1	24.1	22.11
White Swede	Ont.	Globe	Good	3.1	2.7	2.87	21.7	21.9	21.79
Scottish Champion	Ont.	Long	Medium	3.1	2.5	2.81	21.9	21.3	21.59
Knowfield	Ont.	Med. long	Good	3.1	2.6	2.84	19.8	23.3	21.52
East Lothian	Ont.	Globe	Medium	3.0	2.5	2.76	21.8	21.2	21.52
Carter's Prize Winner	Ont.	Globe	Good	2.9	2.4	2.66	20.4	22.6	21.50
Bangholm	Ont.	Globe	Good	3.1	2.5	2.79	21.1	21.8	21.45
Elephant (or) Monarch	Ont.	Quite long	Good	3.0	2.3	2.66	20.3	22.1	21.23
Carter's Imperial Hardy	Ont.	Long	Good	2.9	2.7	2.79	20.5	21.5	21.09
Long's Improved, P.T	Ont.	Long	Good	2.9	2.3	2.60	19.9	22.0	20.98
Green Top	Ont.	Globe	Extra good.	3.1	2.2	2.61	21.1	20.4	20.74
Jumbo	Eng.	Long	Extra good.	3.3	2.2	2.74	22.5	18.8	20.62
Highland Prize, P.T.	Ont.	Long	Medium	2.9	2.1	2.52	20.4	19.7	20.01
White Swede	Ont.	Med. long	Good.	2.6	2.4	2.54	18.7	21.1	19.92
Westbury Improved, P.T.	Ont.	Globe	Medium	2.6	2.2	2.42	19.3	20.1	19.72
P.W.&Co. Imperial Prize P.T	Ont.	Med. long	Good	2.8	2.9	2.84	18.2	21.1	19.65
King of Swedes	Ont.	Med. long	Good	2.7	2.3	2.46	19.0	19.1	19.02
Matson's Purple Top	Ont.	Med. long	Good	2.7	2.2	2.46	18.1	19.6	18.84
Carter's Elephant	Ont.	Quite long	Good	2.4	2.7	2.55	17.1	20.4	18.77
Sutton's Champion	Ont.	Long	Good	3.2	2.2	2.69	18.5	18.2	18.36
Aroostock Improved	U. S.	Med. long	Good	2.3	2.1	2.18	16.3	19.6	17.94
Hazard's Improved	Ont.	Long	Medium	2.7	2.2	2.43	17.1	18.5	17.80
Drummond's Imperial	Ont.	Long globe.	Extra good.	2.7	2.3	2.52	16.5	18.9	17.70
Fetticairn Green Top	Ont.	Med. long	Good	2.8	2.3	2.51	16.2	19.0	17.61
Hall's Westbury	Ont.	Med. long	Medium	2.3	2.2	2.28	15.6	19.2	17.38
White Rock	U. S.	Globe	Medium	2.3	1.9	2.10	15.9	18.5	17.17
Ashcroft's P. T.	Ont.	Med. long	Good	2.5	2.1	2.29	16.7	17.1	16.87
Burn's Selected East Lothian	Ont.	Med. long	Medium	2.4	1.9	2.15	17.3	16.1	16.66
White Sweet Russia	Ont.	Long	Good	2.4	2.3	2.36	16.1	17.2	16.63
Long Island	U. S.	Med. long	Good	2.3	2.1	2.17	14.3	18.2	16.24
Budlong's White Ruta Baga.	U. S.	Globe	Medium	2.1	1.8	1.96	14.9	16.1	15.46
Carter's Elephant	Ont.	Quite long	Good	2.4	1.9	2.15	15.2	15.7	15.46
Carter's Elephant	Eng.	Quite long.	Medium	2.6	1.7	2.11	16.7	13.9	15.27
Marquis of Lorne, P.T	Ont.	Quite long	Good	2.4	1.9	2.13	14.1	16.9	15.15
Average				2.8	2.5	2.56	19.0	20.4	19.72

Of these 42 varieties, 17 yielded at the rate of more than 700 bus. per acre. Marshall's Purple Top, which comes second in order stands fifth in the list of varieties grown for two years, and Hazard's Swede turnip which stands fourth is second in the list for two years. Carter's Elephant grown from seed obtained from one seedsman stood first in varieties grown in 1890, and very low from seed purchased from another seedsman. In 1891 the yields also vary with the sources whence the seed is obtained. There is evidently some confusion in regard to the seed of this variety.

TABLE XXXIV. The yields per acre of the best ten varieties of Swedes for the past two years.

Variety.	Average yield per acre, 1890-91.
	tons.
Royal Norfolk Purple Top	21.15
Hazard's Swede Turnip	20.92
Carter's Elephant	19.87
Knowfield	19.54
Marshall's Purple Top	19.30
Fetticairn Green Top	19.26
Carter's Imperial Hardy	18.91
Highland Prize Purple Top	18 64
Hall's Westbury	18.19
White Swede	18.04

The Royal Norfolk Purple Top which stands first in the above table, stood third in 1890, and ninth in 1891. The yield per acre of this variety is 705 bushels. The average yield per acre is 646⅔ bushels.

(18) SWEDE TURNIPS, THINNING PLANTS TO DIFFERENT DISTANCES IN THE DRILL.

In this experiment twenty rows of turnips were grown. They comprise three plots, and the rows were grown side by side in each plot. The first plot comprised two rows in each instance, thinned to the distance of 20, 16, 12, 8 and 4 inches respectively. The second and third plots were similar, with the difference that the rows were single. The average weights of the roots and of the yields comprise the average of all the rows similarly treated in each plot. We have therefore, in each instance, averages of four rows.

TABLE XXXV. Yields per acre.

Inches between plants.	Average weight per root.	Average yield per acre.
	lb.	tons.
20	2.94	17.47
16	3.14	22.48
12	3.65	25.39
8	2.89	26.06
4	1 42	33.28

While the plots in this experiment were too small to take the results as safe guides to follow, yet the experiment would seem to indicate that the average weight per root decreases with the decrease of distance between the roots in the drill, down to 4 inches apart, and that the average yield per acre increases with the same.

(19) FALL TURNIPS, COMPARATIVE TEST OF VARIETIES.

In 1891, 15 varieties of fall turnips, sometimes called white and yellow fleshed, were grown, each plot consisted of two drills, 6 rods long, and the rows were 27.2 inches apart. The different plots were also separated by the same distance. In one drill the plants were thinned to the distance of 12 inches, and in the other to 16 inches. They were sown on June 20th in drills, made with the double mould board plow. The first table below gives the characteristics and yields of 15 varieties, and the next one gives the yields of the best 5 varieties grown for two years.

TABLE XXXVI. Characteristics and yields of fifteen varieties of Fall Turnips.

Varieties.	Seed obtained from.	Description of roots.			Average weight per root.		Average weight per root, two seedings.	Yield per acre.		Average yield per acre.
		Shape of roots.	Inside color of roots.	Firmness of flesh.	Thin seeding.	Thick seeding.		Thin seeding.	Thick seeding.	
					lb.	lb.	lb.	tons	tons	tons.
Grey Stone Improved	Ont.	....	White.	Poor.	4.7	3.9	4.29	25.9	32.6	29.28
Red Globe Norfolk	Ont.	Globe.	White.	Poor.	4.3	3.0	3.67	29.3	28.1	28.69
Jersey Navet	U.S.	Globe.	White.	Poor.	4.1	3.4	3.74	27.4	29.0	28.23
Grey Stone	Ont.	Globe.	White.	Poor.	3.9	3.2	3.56	27.7	28.5	28.08
Purple Top Main	Ont.	Slightly flat.	White.	Medium	4.0	2.9	3.48	28.3	23.9	26.09
Red Top Strap Leaf	Ont.	Flat.	White.	Poor	3.6	2.7	3.15	26.4	25.6	25.97
Early Purple Top Munick	U.S.	Flat.	White.	Medium	3.5	2.7	3.09	25.9	25.8	25 85
Pomeranian White Globe	Ont.	Globe.	White.	Medium	3.3	2.7	3.00	21.8	26.6	24.20
Orange Jelly	Ont.	Slightly flat.	Yellow.	Good.	4.3	2.1	3.17	28.6	19.5	24.03
White Globe	Ont.	Globe.	White.	Poor.	3.5	2.8	3.13	23.7	24.3	24 03
Early American Red Top	U.S.	Flat.	White.	Poor.	2.9	2.6	2.76	19.2	25.1	22 10
Golden Ball	Ont.	Globe.	Yellow.	Poor.	3.0	2.5	2.73	20.8	22.4	21 59
White Stone	Ont.	Flat.	White.	Poor.	2.9	2.5	2.73	16.8	22.4	19 60
Yellow Aberdeen Green Top	Ont.	Flat.	Yellow.	Good.	2.5	2 2	2.38	18.0	18.0	18 00
Yellow Aberdeen Purple Top	Ont.	Globe.	Yellow.	Good.	2.1	2.3	2.22	14.7	19.8	17 26
Average					3.5	2.7	3.14	23.6	2.48	24.20

It will be observed that of the "white fleshed" varieties, 8 come first in the order of yield. The total average yield per acre of the white fleshed varieties is 25.6 tons, and of the 4 yellow fleshed sorts 20.22 tons. The remarks made in the column under the heading "firmness of flesh," are based upon an examination of the roots made about the middle of December.

TABLE XXXVII. The yield per acre of the best five varieties of Fall Turnips for the past two years.

Varieties.	Yield.
	tons.
Red Globe Norfolk	27.65
Red Top Strap Leaf	23.33
Pomeranian White Globe	22.00
Orange Jelly	21.60
Purple Top Mammoth	20.46

The Red Globe Norfolk which stands first in the above table, stands second among the varieties grown during 1891. The Red Top Strap Leaf, occupying second place, stands sixth in the list of 1891. The average of the 5 varieties is 767 bushels per acre.

(20) MANGELS, COMPARATIVE TEST OF VARIETIES.

There were 36 varieties of Mangels grown during 1891. Two drills 6 rods long were rown of each variety. The distance between the drills was 22½ inches and all the varie-ies were grown side by side. In one drill the plants were thinned to 7 inches, and in he other to 14 inches apart. They were sown 23rd May. The first table following ives a report of 35 varieties grown in 1891, and the next table a report of the five est varieties grown for two years.

TABLE XXXVIII. Characteristics and yields of 35 varieties of mangels grown in 1891.

Varieties.	Seed obtained from.	Description of roots.			Average weight per root.		Average weight per root, two seedings.	Yield per acre		Average yield per acre.
		Shape	Uniformity	Color.	Thin seeding	Thick seeding		Thin seeding	Thick seeding	
					lb.	lb.	lb.	tons	tons	tons
Improved Mammoth Prize Long Red	Ont.	Long	Even	Red	2.9	2 2	2.55	30.1	41.1	35.56
Carter's Champion	Ont.	Half long	Even	Pink yellow	3.0	2.5	2.77	30.2	38 0	34.09
Mammoth Sawlog	Ont.	Long	Even	Red	2.8	2.6	2.68	28.0	40.0	34.00
Steele Bros.' Long Red Selected	Ont.	Long	Medium	Red	2.9	2.4	2.61	25.5	41.2	33.33
Norbitan Giant	Ont.	Long	Medium	Red	3.2	2.0	2.59	30.9	33.3	32.07
Eiffel Tower	U.S	Half long	Medium	Red	2.9	2.0	2.46	29.8	34.3	32.04
N. B & Co., Dignity	U.S.	Half long	Medium	Dark red	2.7	2 3	2.47	26.5	37.2	31.87
Holstein	U.S.	Long	Medium	Red	2.6	2.1	2.33	24.9	35.1	29 98
Long Red Selected Stock	Ont.	Half long	Even	Pink yellow	2.6	2.4	2.31	24.7	38.9	29.75
Colossal Long Red	U.S.	Very long	Uneven	Red	2.7	2.0	2.32	25.1	34.2	29.66
Oblong Giant Yellow	Ont	Med. long	Even	Yellow	2.6	2.0	2.29	23 8	34.2	28.99
Yellow Obendorf	Ont.	Half long	Even	Yellow	2.6	2 0	2.30	23.5	34.2	28 81
Chirk Castle	U.S.	Long	Even	Red	2.1	2.0	2.03	21.7	35.7	28.69
Long Red	Ont.	Long	Medium	Red	2.4	2 3	2.31	22.6	31.9	27.25
Long Oxhorn	Ont.	Very long	Medium	Red	2.5	1.9	2.19	22.4	32.0	27.20
Carter's Mammoth Long Red	Ont.	Long	Medium	Red	2.3	2.0	2.17	22.8	31.6	37.17
Steele's Mammoth Long Red	Ont.	Long	Even	Red	2.5	2.2	3.31	22.9	31.1	26.99
Carter's Warden Orange	Ont.	Globe	Even	Dark yellow	2 3	1.9	2.10	21.6	32.3	26.67
Yellow Oval Shaped Giant	Ont.	Med. short	Even	Yellow	2.4	1 9	2.17	23.5	29 1	26 29
Elvetham Long Red	Ont.	Long	Medium	Red	2.1	1.7	1.87	20.5	30 1	25.33
New Monarch	Ont.	Med. long	Medium	Red	2.2	1.7	1 98	20.5	29 9	25 23
Mammoth Red Intermediate	Ont.	Long	Even	Light red	2.2	2.0	2.11	21.2	29 2	25.23
Red Oval Shaped Giant	Ont.	Med. long	Even	Red	2 0	2.3	2.14	17.0	33.2	25.08
Oblong Giant Red	Ont.	Half long	Medium	Red	1.8	1 6	1 72	18.3	29.1	23 71
May's Mammoth Long Red	U.S.	Long	Even	Red	2.1	1.8	1.93	19 8	26.8	23.30
Golden Giant	U.S.	Globe	Even	Dark yellow	2 0	1 7	1.86	19.9	26.2	23 06
New Golden Intermediate	Eng.	Med. short	Even	Dark yellow	1.8	1.8	1.70	17.1	28.8	22.97
Fisher Hobbs' Orange Globe	Ont.	Globe	Even	Yellow	2.0	1.6	1.80	18.4	25.7	22.06
Red Globe	Ont.	Globe	Even	Red	1 8	2 0	1.88	18.5	25.3	21.89
Clark's Devon Orange Globe	Ont.	Globe	Even	Dark yellow	1 9	1.5	1.66	17.0	26.1	21.54
Long Yellow	Ont.	Long	Medium	Dark yellow	2.0	1 8	1 92	18.4	21 5	21 45
Golden Tankard	Ont.	Half long	Medium	Dark yellow	1.9	1.5	1.72	18.5	24.1	21.30
Kniver Yellow Globe	U.S.	Globe	Medium	Light orange	1.7	1.6	1.65	16 1	22.5	19.31
Yellow Globe	Ont.	Half long	Uneven	Pink yellow	2.1	1.5	2.81	20 5	16.4	18.48
Red Tankard	Ont.	Med. short	Medium	Red	1 5	1.6	1.55	12.9	19.3	16.08
Average					2.3	2.0	2.13	22.1	30.8	26.47

The first of the Globe varieties comes eighteenth in the list in point of yield. The distinctively long varieties yielded an average of 28.57 tons per acre, and the six Globe rieties an average of 22 42 tons. The improved mammoth Long Red standing first in e list yielded at the rate of 1,185 bush. per acre. The 7 varieties standing first elded at the rate of more than 1,000 bush. each per acre. The average of all the varie-es was at the rate of 882 bush. per acre.

TABLE XXXIX. The yields per acre of the five best varieties of mangels for two years.

Varieties.	Average yield per acre 1890-1891.
	tons.
Norbitan Giant	22.94
Long Red	19.28
Carter's Warden Orange	18.32
Mammoth Red Intermediate	18.31
Fisher Hobb's Orange Globe	17.63

Norbitan Giant, first in the above list, came seventh among varieties grown in 1890. The yield of this variety per acre for the past two years is 765 bush. and of the 5 varieties 643 bushels.

(21) CARROTS, COMPARATIVE TEST OF FIFTEEN VARIETIES.

In 1891, 15 varieties of carrots were sown the same date as the mangels previously reported on. The seed came up so irregularly that the ground was plowed up and sown with rape reported on under the head of the live stock experiments.

(22) SUGAR BEETS, COMPARATIVE TEST OF VARIETIES.

In 1891 four varieties of sugar beets were grown. Each of these was sown upon drills 6 rods long. The drills were 22 inches apart. In one drill the plants were thinned to 12 inches in the row, and in the other drill to six inches. They were sown May 23rd. The following table gives the results of the test:

XL. Sugar Beets, comparative test of varieties.

Varieties.	Seed obtained from.	Description of roots.		Average weight per root.		Average weight per root, two seedings.	Yield per acre.		Average per yeild acre, two seedings.
		Shape.	Uniformity.	Thin seeding.	Thick seeding.		Thin seeding.	Thick seeding.	
				lb.	lb.	lb.	tons.	tons.	tons.
Vilmorin's Improved White	Ont	Globe	Medium	2.4	1.9	2.02	17.6	25.0	21.30
German White	Ger	Long Globe	Medium	1.8	1.5	1.64	19.0	22.4	20.71
Silesian	Ont	Long Globe	Good	1.7	1.4	1.53	17.6	23.6	20.59
French White	Ont	Long.	Medium	1.6	1.3	1.42	13.3	20.4	16.87
Average				1.8	1.5	1.65	16.8	22.6	18.86

The German White, the kind which has been grown most extensively over the Province to be tested as to the percentage of sugar which it produces, stands second in point of yield. The average yield of the four varieties is 19.86 tons per acre, that is to say, 4.86 tons higher than the standard usually adopted as an average crop for the production of sugar.

(23) COMPARATIVE YIELD OF ROOTS UPON FLAT AND RIDGED LAND.

There were 9 plots in all grown with flat cultivation: 3 with Swede turnips, 3 with mangels, and three with sugar beets, each plot contained 7 rows. A similar number of plots of the same kind of roots were grown with ridged cultivation. The figures in the table represent the average of the plots in the triplicate experiment.

TABLE XLI. Yield of Roots upon flat and ridged land.

Cultivation.	Average yield per acre (tons).		
	Swede turnips.	Mangels.	Sugar beets.
lat cultivation	26.06	21.55	13.02
idged cultivation	25.83	19.52	12.91

The average yields with each kind of roots are greater from the plots grown with at cultivation, and it is most marked in the case of the mangels, which gave 10.4 per ent. of an increase more than when the plants were grown upon the ridges.

24) SWEDE TURNIPS, MANGELS, AND SUGAR BEETS GROWN AT DIFFERENT DISTANCES BETWEEN THE DRILLS.

There were 21 rows grown of each of the above, which were 95 links long. These ere grown with the distances between the rows of 16, 24 and 28 inches respectively, nd there were 7 rows of each of the above. These varieties were also all grown in uplicate plots. The following table shows the average results :

TABLE XLII. Roots grown at different distances, forty-two rows of each.

Distance between rows.	Average yield per acre (tons).		
	Swede turnips.	Mangels.	Sugar Beets.
6 inches	27.39	24.05	14.03
4 do	26.66	21.15	13.36
8 do	23.78	16.41	11.51

From the above it is apparent that the lots with the shortest distance between the ows gave the highest yields in every instance, but further tests will be required before onclusions can be drawn which may be followed with safety.

(25) LARGE PLOTS WITH SUGAR BEETS, SWEDE TURNIPS, MANGELS AND CARROTS.

Large plots of sugar beets, turnips, mangels, and carrots were grown in 1891. The bject was two-fold, viz. : 1st, to test the comparative yields of these various kinds of oots ; 2nd, with some of them to test the comparative yields from growing them on round to which different quantities of farmyard manure had been applied. They were rown in field No. 12, where the soil is a clay loam with a leaning to a gravelly texture. his field was plowed out of sod in the spring of 1889. It grew a crop of pease that ason. In 1890 it produced oats. The manure was applied on the surface in the utumn of 1890.

Sugar Beets. One acre of sugar beets was sown in drills 20 inches apart. These rills were made with the double mould-board plow. They were sown with a turnip rill May 15th. The variety was the German White, and the seed was sown at the rate t 16 pounds to the acre. Fifteen loads of farmyard manure fairly well rotted had been pplied the previous autumn. The yield was 19.17 tons, or of trimmed roots 18.22 tons. n the small plot previously reported upon the yield was 20.7 tons per acre, or of rimmed roots 19.7 tons. As this experiment has already been dwelt upon in a previous art of the report it is not necessary to say anything further here.

Swede Turnips. Two half-acre plots were grown of the Bangholm variety. Fairly well rotted farmyard manure was applied to one plot at the rate of 18 loads to the acre, and to the other at the rate of 36 loads per acre. Drills were made with the double mould-board plow 28 inches apart. The seed was sown June 20th and the roots were harvested October 29th. They were thinned to the distance of 14 inches in the row. The results were as follows :

18 loads per acre of manure....................	22.56 tons of roots.
36 " " "	24.64 "

From these results it is apparent that caution must be exercised as to the amount of farmyard manure to be applied in growing a crop of turnips.

Mangels. Two half-acre plots of mangels of the Mammoth Long Red variety were grown. The soil, amount of manure applied and general cultivation given was the same as in the case of the turnips reported upon above, with the difference that the drills were 26 inches apart, and the aim was to thin the plants to 14 inches. The seed was sown May 14th. The following are the yields per acre :

18 loads per acre of manure..	21.3 tons of roots.
36 " " "	25.25 "

In growing mangels the same caution should be exercised in regard to the application of too large quantities of manure, as in growing turnips.

Carrots. One acre of carrots was sown on May 14th in drills 24 inches apart. The manure had been applied at the rate of 15 loads per acre, but owing to the dry weather not more than half the space in the drills had carrots. The yield was 11.28 tons.

3. SILO AND FORAGE CROPS.

The experiments under this head include those carried on with fodder corn, rape, millet, clover and grasses. They were grown in different fields. They include 268 plots.

(*a*) *Crop for the Silo.* In 1890 three classes of experiments were conducted with fodder corn for the silo. These were (1) a comparative test of 76 varieties grown upon sod and stubble land respectively ; (2) a test of 8 plots grown with and without salt on four kinds of soil ; and (3) growing fodder corn in hills as against drills.

(26) Fodder Corn, Comparative Test of Varieties on Sod, and on Stubble Land.

In 1891, 84 varieties were grown. The seed was obtained chiefly from the Southern States and some was procuredin Ontario. All these varieties were grown in duplicate ; in the first instance upon sod which had not been plowed for six years, and in the second on land which had grown different kinds of grain for four years previously. The sod was turned under in the autumn of 1890. No manure was applied nor had it received any since 1886. The stubble land was also plowed the previous autumn and had received a fair application of farmyard manure in the spring of 1890. The soil was a mild clay loam and rather low lying. The corn was planted in hills 5 links or 39.6 inches apart each way. But one row of each variety was planted on each of the two kinds of soil. The rows were 165 feet long on the plot plowed out of sod, and 99 feet long on the other plot. But four plants were left in each hill. Thorough shallow cultivation was given the rows ooth ways. The first table below gives the characteristics of 76 varieties of fodder corn grown during 1891. The second gives the yields per acre of 35 varieties, grown for three years, and the third the yields per acre of 41 varieties grown for one year only.

TABLE XLIII. Characteristics of seventy-six varieties of Fodder Corn.

Varieties.	Class of corn.	Color of grain.	Length of plant.	Average length of ten of the best developed ears.	Maturity.
			inches.	inches.	
1 Sheep's Tooth	Dent	White	111	5	Late.
2 Chester County Mammoth	"	Yellow	100	6	Very late.
3 Calico Dent	"	Mixed	97	7	Late.
4 Leaming Yellow	"	Yellow	107	6½	Medium late.
5 Cranberry W. Dent	"	White	104	5	Late.
6 Compton's Early	Flint	Yellow	80	8	Early.
7 Wisconsin Y. Dent	Dent	"	87	5½	Medium late.
8 Mammoth Southern Sweet	"	White	84	5	Late.
9 South Western	"	"	104	6	"
10 Wisconsin W. Flint	Flint	"	82	6½	Medium.
11 King Philip	"	Red	83	7½	Very early.
12 Hickory King	Dent	White	108	5	Late.
13 Egyptian Sweet	Sweet	Yellow	84	6	"
14 Horsetooth	Dent	"	89	7½	Medium.
15 Red Cob Ensilage	"	White	97	5½	Late.
16 Parish W. Dent	"	"	110	....	
17 Woodsworth Y. Dent	"	Yellow	89	6	Late.
18 Sibley's Pride of the North	"	"	83	6	Medium.
19 White Flint	Flint	White	82	8½	Medium early.
20 Longfellow	"	Yellow	80	8	"
21 Wisconsin W. Dent	Dent	White	83	7	Medium.
22 Giant Prolific Sweet Ensilage	"	"	85	5½	Late.
23 Angel of Midnight	Flint	"	78	7½	Early.
24 Golden Dewdrop	"	Yellow	67	9¼	Very early.
25 Pride of the North	Dent	"	85	6½	Early.
26 North Star Yellow Dent	"	"	73	5½	Medium.
27 100 Day Corn	Flint	"	86	7½	Early.
28 Early Adams or Burlington	Dent	White	80	5	Medium.
29 Hickox Sweet	Sweet	....	77	7½	Medium late.
30 Evergreen Sweet	"	....	82	6½	Late.
31 Canada Yellow	Flint	Yellow	74	7¾	Early.
32 Pearce's Prolific	"	"	66	8	Medium.
33 Tuscarora	"	White	84	7	Late.
34 Self-Husking	"	Red	79	8¼	Very early.
35 Old Colony	Sweet	Yellow	70	6	Late.
36 Brazilian Flour	Flint	White	89	....	"
37 Cloud's Early Yellow	Dent	Yellow	108	6½	Medium.
38 Thoro'bred White Flint	Flint	White	89	6½	Late.
39 Mastodon Dent	Dent	Yellow	104	7½	Medium.
40 Mammoth White Surprise	"	White	115	4½	Very late.
41 Blunt's Prolific	"	"	112	5¾	Late.
42 Mammoth Sweet Fodder	Sweet	....	108	6	Medium late.
43 Leaming Field Corn	Dent	Yellow	104	6½	Late.
44 Mammoth Cuban	"	"	99	7	Medium.

TABLE XLIII. Characteristics of 76 varieties of Fodder Corn —*Continued.*

Varieties.	Class of corn.	Color of grain.	Length of plant.	Average length of ten of the best developed ears.	Maturity.
			inches.	inches.	
45 Improved Leaming	Dent	Yellow	106	7	Medium.
46 Salzer's South Dakota	Flint	"	80	8½	Early.
47 Yellow Western	Dent	"	97	6¾	Medium.
48 Salzer's North Dakota	Flint	White	86	7½	Medium late.
49 Centennial White	Dent	"	102	6½	Medium.
50 Golden Beauty	Dent	Yellow	92	7	Late.
51 Early Butler	"	"	88	6½	Early.
52 Queen of the Prairie	"	"	102	6½	"
53 Late Mammoth	Sweet	"	75	5½	Late.
54 Northern White Pearl	Dent	White	82	6	Medium.
55 Wisconsin Earliest W. D.	"	"	89	6¾	Medium early.
56 Improved Clarage	"	Yellow	98	6½	Medium.
57 Virginia Horse Tooth	"	White	112	4	Very late.
58 White Flour	Flint	"	78	5¼	Late.
59 Wauskakum	Dent	Yellow	76	7½	Early.
60 Salzer's Superior Fodder Ensilage	"	White	86	5½	Late.
61 Mammoth White Cob Ensilage	"	"	110	6	"
62 Dakota Dent	"	Yellow	80	7	Medium.
63 Clark's Co. Champion	"	White	95	5¾	Medium early.
64 White Western	"	"	95	6	Late.
65 Golden Dent	"	Yellow	85	6	Medium early.
66 Stowel's Evergreen	Sweet	"	84	6	Late.
67 Sweet Fodder	"	"	77	5	"
68 Early White Flint	Flint	White	75	8½	Medium.
69 Smutnose	"	"	73	7¼	Late.
70 Marblehead Mammoth	Sweet	Yellow	69	6½	Medium.
71 King of the Earlies	Dent	"	83	6¼	Early.
72 Rideout or Mercier	Flint	"	71	6	Very early.
73 Minnesota King	Dent	"	74	6¾	Early.
74 Queen of the North	"	"	72	5½	"
75 Crosby	Sweet	Red	61	5	Medium early.
76 North Dakota Red	Flint	Yellow	50	4½	Very early.

It should be remembered that these varieties were grown for fodder purposes, whether in the green or dried state, or cured in the silo. Of the 76 varieties grown 21 were flint sorts, 47 were dent and 8 sweet varieties. As is generally known, the dent varieties are large yielders, but take a longer season to reach maturity than the flint sorts. Owing to the shortness of our seasons several of the dent varieties do not sufficiently mature for the silo in some parts of Ontario. The flint varieties mature earlier, but are more apt to be deficient in quantity of fodder. In growing fodder corn the aim should be to get the largest yielding variety, which will give the greatest weight of ears and will also mature sufficiently for the silo before the time of frost. The sweet varieties are inclined to be deficient in yield. It will be observed that several of the dent varieties stand at the head of the list, but a few of the flint varieties also stand high and they mature early.

TABLE XLIV. Yields per acre of thirty-five varieties of Fodder Corn grown for three years

Varieties.	Average weight per ear of those best developed. 1891.	Weight of green ears per acre. 1891.	Average weight per acre of the whole crop on sod and stubble, 1891.	Average yield per acre of the whole crop, 1889-90-91.
	oz.	lb.	tons.	tons.
1 Sheep's Tooth	2.7	1,966	16.70	16.62
2 Chester County Mammoth	4.6	1,800	20.10	16.41
3 Calico Dent	5.1	4,333	14.40	15.25
4 Leaming Dent	2.9	3,866	13.30	15.23
5 Cranberry W. Dent	4.8	900	12.80	15.10
6 Compton's Early	2.7	6,000	17.30	15.03
7 Wisconsin Y. Dent	2.8	3,166	11.50	14.94
8 Mammoth Southern Sweet	3.4	1,060	12.90	14.86
9 South Western	5.8	1,700	12 70	14.62
10 Wisconsin W. Flint	4 9	5,735	13.10	14.55
11 King Philip	1.8	5,333	16.00	14.46
12 Hickory King	2.4	666	10.00	14.33
13 Egyptian Sweet	4.2	1,466	14.90	11.23
14 Horsetooth	2.6	4,500	15.30	14.18
15 Red Cob Ensilage	4,0	933	13.90	14.17
16 Parish W. Dent	3.9	400	16.90	14.01
17 Woodworth's Y. Dent	3.5	1,966	14.50	13.75
18 Sibley's Pride of the North	3.8	3,133	11.30	13.47
19 White Flint	3.3	4,433	13.50	13.34
20 Longfellow	5.1	4,000	14.50	13.14
21 Wisconsin W. Dent	4.1	4,800	10.90	12.77
22 Giant Prolific Sweet Ensilage	3.6	2,000	12.60	12.74
23 Angel of Midnight	4.4	3,333	11.90	12.69
24 Golden Dewdrop	3.8	4,733	12.10	12.63
25 Pride of the North	3.6	4,200	11.40	12.17
26 North Star Yellow Dent	3.5	2,466	9.20	11.81
27 100-Day Corn	3.4	3,466	8.70	11.59
28 Early Adams, or Burlington	3.7	2,933	11.00	11.22
29 Hickox Sweet	3.9	3,066	11.30	11.14
30 Evergreen Sweet	3.7	1,933	12.20	10.90
31 Canada Yellow	3.1	3,366	11.40	10.78
32 Pearce's Prolific	3.5	1,733	6.50	10.55
33 Tuscarora	3.5	2,200	11.10	10.33
34 Self Husking	3.3	3,833	10.10	10.04
35 Old Colony		2,533	10.90	8.78

It is interesting to notice the variations in the yields per acre of ears in the different sorts. In the fifth and sixth varieties this variation is not less than 5,100 lb. From the foregoing table we may also conclude that for quantity and quality of fodder and earliness in maturing, the Compton's Early, Wisconsin White Flint, Leaming Yellow, and Wisconsin Yellow Dent are probably the most suitable for the silo among the 35 varieties tested here for the past three years.

TABLE XLV. Yields of forty-one varieties of Fodder Corn for one year only.

Varieties.	Seed obtained from	Average weight per ear of those best developed.	Weight of ears per acre.	Total weight per acre.
				ton.
36 Brazilian Flour	U. S.	1.00	....	21.3
37 Cloud's Early Yellow	"	6.61	76.66	20.6
38 Thoro'bred White Flint	Ont.	2.91	17.33	19.9
39 Mastodon Dent	U. S.	5.20	52.00	19.9
40 Mammoth White Surprise	"	2.89	7.00	19.3
41 Blunt's Prolific	"	3.04	12.66	19.0
42 Mammoth Sweet Fodder	Ont.	3.25	20.33	18.3
43 Leaming Field Corn	U. S.	4.62	44.66	17.8
44 Mammoth Cuban	"	5.74	68.66	17.1
45 Improved Leaming	"	3.18	44.00	16.3
46 Salzer's South Dakota	"	3.76	59.00	16.3
47 Yellow Western	....	4.00	44.00	15.7
48 Salzer's North Dakota	U. S.	3.74	38.66	15.6
49 Centennial White	"	4.77	45.33	15.5
50 Golden Beauty	Ont.	3.66	34.66	14.6
51 Early Butler	U. S.	6.54	74.66	14.3
52 Queen of the Prairie	"	4.03	42.66	14.0
53 Late Mammoth	"	2.13	16.00	14.0
54 Northern White Pearl	....	4.56	40.66	14.0
55 Wisconsin Earliest W. D	U. S.	5.85	53.66	13.9
56 Improved Clarage	"	4.73	45.33	13.8
57 Virginia Horsetooth	"	1.80	3.00	13.8
58 White Flour	"	2.08	16.00	13.3
59 Wauskakum	"	3.57	44.33	13.3
60 Salzer's Superior Fodder Ensilage	"	3.43	20.00	13.1
61 Mammoth White Cob Ensilage	Ont.	3.18	23.33	13.0
62 Dakota Dent	U.S.	5.19	59.33	12.9
63 Clark's Co. Champion W. D	....	4.67	38.66	12.8
64 White Western	....	4.00	10.00	12.0
65 Golden Dent	Ont.	3.93	38.66	11.5
66 Stowel's Evergreeen	U.S.	3.63	26.66	11.3
67 Sweet Fodder	"	2.72	15.66	11.1
68 Early White Flint	Ont.	4.07	40.00	11.0
69 Smutnose	'	4.71	48 66	10.6
70 Marblehead Mammoth	U S.	3.18	24 66	10.6
71 King of the Earlies	"	4.61	50.00	10.4
72 Ridout or Mercier	"	4.74	40.66	10.2
73 Minnesota King	"	4.09	41.66	9.9
74 Queen of the North	"	4.06	42.33	9.4
75 Crosby	"	3.05	30.00	7.8
76 North Dakota Dent	"	4.31	25.66	3.9

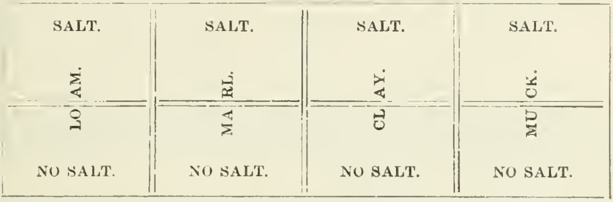
Of the varieties in the above table 14 of them yield more than 15 tons per acre, and 12 of the number are from the United States. Cloud's Early Yellow is both a good yielder of fodder and of ears, and in some localities it would likely reach a sufficiently matured state to make good ensilage. The Mammoth Cuban, though not so high in the list in point of yield as some other varieties, is possessed of more than average promise, judging from its habits of growth.

(27) INFLUENCE OF SALT WITH FODDER CORN ON FOUR KINDS OF SOIL.

Some seven years ago a plot was formed in the central part of the experimental field for the purpose of testing four kinds of soil under as near the same conditions as could be obtained. The whole plot is eight rods long by two rods wide, and is divided into four portions, each being two rods square. The soil is well supplied with tile drains. One end of the plot is a natural muck. The surface soil of the two central plots was removed to a depth of two feet and then one was filled with clay of a rather heavy nature and the other with marl intermixed with loam, while the remaining portion, being naturally a good clay loam, was left untouched.

In the spring of 1888, each portion was divided into two equal parts, and boards placed edgeways in the ground at the division and they extended from one end of the plot to the other.

The accompanying diagram will illustrate the position of the soils and the divisions of the same:



The treatment of the plot throughout was similar until the spring of 1888, when salt was applied at the rate of 400 lb. per acre on the soils of one side of the division through the centre, while the remaining half of each kind of soil was left without salt. Barley was sown upon the whole plot and the results were presented in the College Report of 1888. In the spring of 1889 salt was again applied at the rate of 400 lb. per acre upon the same portions as in 1888 and oats sown over the whole plot. Rape was grown in 1890 without any addition of salt.

In the spring of the present year fodder corn was planted upon these plots in hills 39.6 inches apart each way. Salt was applied to the same half of the different soils which had received the same previously. The plants were thinned to four in each hill.

The results from the crops of the last four years are given in the following table.

Table xlvi. Yields per acre from growing Barley, Oats, Rape and Fodder Corn upon four kinds of soil, with and without salt.

Soil.	1888—Barley.		1889—Oats.		1890—Rape.		1891—Fodder corn.	
	Salt.	No salt.	Salt.	No salt.	Salt.	No salt.	Salt.	No salt.
	bush.	bush.	bush.	bush.	tons.	tons.	tons.	tons.
Loam	35½	35	55⅓	52⅓	9.45	6.56	9.24	8.68
Marl	18¾	17½	38¼	36½	6.72	3.92	7.68	6.08
Clay	28	20½	48¼	41⅛	2.81	2.40	9.34	10.34
Muck	18¾	11⅔	....	....	4.77	4.28	12.40	12.30

(28) Fodder Corn, Hills *versus* Drills.

In this experiment there were four plots, two of which had hills and the other two drills. Each plot was 8 rods long by 1⅔ rods wide. The hills were 39 inches apart each way. The drills were the same distance apart. The corn was planted June 3rd. The soil and previous cropping were the same as with the different varieties grown on the stubble land and described above.

TABLE XLVII. Yields per acre in growing Fodder Corn in hills and in drills.

Varieties.	Hills, yield per acre.	Drills, yield yer acre.
	tons.	tons.
Giant Prolific Sweet Ensilage	16.91	17.25
Smutnose	14.45	14.87
Average	15.68	16.06

This experiment would seem to indicate that the yields obtained from planting in drills will be rather more than those obtained from growing the same varieties in hills, while the labor is somewhat less in growing the corn in drills. But the beneficial effects from cultivation may not be quite so good.

(*b*) *Forage Crops.* In 1890 there were 4 experiments with rape, 1 with millet, 1 with clover, besides those which relate to grasses. Two of the experiments with rape, viz., thick and thin seeding and different distances between the drills were not sufficiently successful to serve as guides for future work and have not therefore been reported upon.

(29) RAPE, APPLICATION OF FERTILISERS.

In this experiment there were 36 plots, each plot contained two rows. One row intervened between every two plots of the experiment. The rows were 5 rods long and 23¾ inches apart. The seed was sown upon slightly raised drills on July 10th. The following fertilisers were applied to the plots, viz., nitrate of soda, muriate of potash, superphosphate, a mixture of equal parts of the three by weight and salt. These were each applied at the rate of 200 lb., 400 lb. and 600 lb. per acre. One plot in each set was left without fertilisers, and all the plots were duplicated. The average results are given below. The fertilisers were sown upon the soil after the plants were nicely above ground and they were cultivated in.

TABLE XLVIII. Report of the use of fertilisers with Rape.

Fertilisers.	Yield of rape per acre from different amounts of fertilisers.			Average.
	200 lb.	400 lb.	600 lb.	
	tons.	tons.	tons.	tons.
Nitrate of soda	14.66	16.89	15.85	15.80
Muriate of potash	11.58	12.77	12.10	12.15
Superphosphate	13.04	12.38	12.42	12.61
Mixture	14.98	13.37	15.94	14.76
Salt	14.50	16.25	14.39	15.05
No fertiliser	14.03	12.45	13.02	13.17

It will be observed that the best absolute returns were obtained from the nitrate of soda but the best relative returns were probably obtained from the salt, cost considered. The muriate of potash and superphosphate in nearly every instance gave lower yields than were obtained from the unfertilised plots. The average yield per acre is as follows from the plots fertilised with the different quantities :

Those which received 200 lb. per acre, 13.75 tons; 400 lb., 14.33 tons; 600 lb., 14.14 tons, and the mean average of all the fertilised plots was 14.07 tons. This would seem to indicate that 600 lb. per acre of any of these fertilisers was not required by the crop.

(30) RAPE, THINNING PLANTS TO DIFFERENT DISTANCES IN THE DRILLS.

In 1891, 18 plots of rape were grown to ascertain the results from thinning at different distances in the drill. Each plot comprised two rows, and a third one in every instance which was not included in the reckoning, separated the plots. The rows were 89.8 feet long. The plants in the rows of the different plots were thinned to the distance of 12, 8, 4, 2, and 1 inches, and in one instance the plots were left unthinned. The unthinned plot was sown at the rate of 6 lb. per acre. The experiment was a triplicate one. The rape was sown May 10th, and the distance apart was 23¾ inches.

TABLE XLIX. Report of test of thinning Rape plants in the drills.

Distance between plants in the drill.	Test No. I. yield per acre.	Test No. II. yield per acre.	Test No. III. yield per acre.	Average yield per acre.
	tons.	tons.	tons.	tons.
12 inches	10.83	10.98	10.25	10.69
8 inches	11.86	11.31	12.01	11.73
4 inches	12.80	13.35	13.40	13.18
2 inches	16.14	13.95	14.32	14.80
1 inch	15.23	11.38	13.95	13.52
Unthinned	13.86	12.13	13.10	13.03

The plants 2 inches in the row gave the best return. These unthinned gave a smaller return and the quality of the rape was also probably inferior.

THE GROWTH AND USES OF RAPE.

Rape (*Brassica Campestris*) was at one time extensively grown in Europe, for the oil expressed from its seeds. It is now chiefly grown in Britain to provide pasture that will fatten sheep readily. In America where there is not much of it grown as yet, it is used almost entirely for this purpose, although cattle also are pastured upon it to a limited extent.

The soils which are best adapted to the growth of rape, are those of a free-working character. Any soil that is well adapted to the growth of turnips will grow rape readily. It will also grow well on peaty soils rich in humus and fairly so on clay loams, but the result will not be satisfactory where the attempt is made to grow it on stiff clays. On the humus soils there is also difficulty in getting the seed to germinate properly in dry weather.

The proper place for rape in the rotation, is between two crops of grain, and as is the case with turnips, it may be used as a cleaning crop instead of the bare fallow. As a cleaning crop it is even ahead of turnips, especially when it follows rye grown for the silo, owing first, to the smothering influence of the rye, and second to the season at which the ground is plowed and cultivated.

TILLAGE. The preparation of the soil will vary somewhat with the crop preceding the rape. When the rape is not preceeded by rye, autumn cultivation, with a view to weed destruction should follow the removal of the last crop grown, and the spring cultivation up to the time of the sowing of the rape, may be the same as that applied to the bare fallow. When rye precedes the rape it should be sown in August if intended for pasturing the autumn and spring following. If intended for fodder or the silo, it may be sown early in September, but will sometimes do well when sown later. In any case not less than two and a half bushels of seed should be sown. The rye may be cut with the binder when the head begins to come out, and cured in the shook when intended for winter fodder. It should be cut at a later stage when put into the silo. The ground is plowed evenly as soon as the rye is removed. The skimmer should be used on the plow, that all vegetation may be turned under. The plowing after the rye is removed, will take place about the end of the first week in June. If the rye has been pastured, the ground may be plowed sooner. It may then be harrowed occasionally until the sowing of the rape.

If barnyard manure can be spared for the rape, its application will be followed by a much better crop. It may be applied in the autumn or in the spring when the rape is not preceded by rye. When rye precedes the rape there will probably not be time to apply farmyard manure after the rye is removed. The aid of artificial fertilisers may then be called in. 200 to 300 pounds of salt may be sown broadcast before the last harrowing preceding the drilling of the ground for the rape. 100 pounds of nitrate of soda or a less quantity may then be applied about the time of the first cultivating.

Seeding and Cultivation. The time for sowing the rape in Ontario, is a little later than that chosen for sowing turnips, viz: the last week in June. The ground is put into low drills by using the double mould board plow. These may be from 20 to 25 inches apart, and the seed is sown at once with the turnip drill, which should follow closely after the plow. When the weather is dry the field roller may then also be run over the drills as soon as sown. When rape is sown earlier than the period indicated its later development is arrested. When it is sown later, it is too succulent for very profitable feeding.

The quantity of seed sown per acre is about one pound when sown in drills. In dry weather more than this quantity should be sown. Three pounds may be sown when scattered broadcast, but when thus sown, the cleaning of the land is not effected. The variety in common use is known as the Dwarf Essex. When rape is sown on the bare fallow to be plowed in as a green crop, from three to five pounds of seed per acre will suffice. It is useful for this purpose. The cultivation of the rape after it has been sown is much the same as that applied in the case of turnips, with the difference, that it is not usual to thin the rape. The horse-hoe may commence to work as soon as the rough leaf appears, and may be kept going at short intervals until the leaves meet between the rows. If the drills are gone over with the hand hoe once or twice, all weeds may be prevented from going to seed.

Feeding. The pasturing of the rape may commence in September. The exact time in the month will depend somewhat on the time of sowing. The pasturing may continue until the time of snow, which is usually the last half of November.

Any class of sheep or lambs may be pastured upon the rape, but some caution should be used in pasturing breeding ewes upon it, lest they become too fat for breeding in best form. It is specially adapted to the fattening of sheep and lambs which are to be sold for meat. The latter are more frequently pastured upon it than any other form of live stock. Cattle may also be pastured upon it but they destroy more of it through trampling than sheep, hence it is not nearly so much used for fattening cattle.

Sheep, or indeed any class of animals should never be turned in upon the rape when hungry. They are then liable to eat too much which may induce bloating, followed in a short time by death, unless relief is given. As scouring is also likely to be induced at first, the sheep should have access to salt at will, and if they will eat a small ration of oats per day, not necessarily more than half a pint, it will in some degree counteract the tendency to scour. If they are trimmed with the shears before going on the rape the injury from scours is reduced.

When the lambs have access to adjoining pasture, they are less inclined to lie down upon the rape. In times of severe and prolonged frosts, which sometimes happen late in

LAMBS FEEDING UPON RAPE.

November, the danger from feeding on the rape is increased, and the less mature the rape the greater is the danger. The frozen rape seems to induce various forms of digestive derangement, which sometimes end in death. The cold rain and sleet storms of early autumn are also very injurious to them, hence sheds should be provided in which they may be sheltered and fed during the time of these cold storms. They may also be fed in these sheds after the rape is all eaten until the time when they are sold. Where the rape has been drilled, there is also the danger that the lambs will get on their backs when they lie down and so perish, hence it is well to have them visited and counted morning and evening by an attendant. Where the flock is very large the attendant will find a saddle horse a valuable aid.

Experience with Rape. Our experience with rape on this farm is somewhat limited, but it has been grown by a small number of farmers in the neighborhood of Guelph for several years past. In 1889, we grew some twelve acrea at this station, and fattened lambs upon it. In 1890, fifty-four acres were grown. For two months there were pastured upon this rape, seventeen head of steers and 537 sheep and lambs. One acre of the rape sustained twelve head of lambs for two months. At the end of this time, they were ready for sale, and were soon after sold for the Buffalo market, except 120 head, which were reserved for experimental feeding, with a view of shipping them to Britain, in the month of May. The sheep and lambs were purchased by Mr. J. E. Storey, the farm foreman in the counties of Carleton and Lanark, in the eastern part of Ontario. The 364 head, which were shipped to Buffalo, on the 18th December, 1890, brought $5.62 per 100 pounds live weight. The gain on each lamb of the lot, up to the time of sale, after paying all expenses of purchasing, freight, additional food and attendance, was fully $1.40 per head, that is to say, the food provided by each acre of the rape, was worth to us $16.80. The return would have been better had the lambs been a uniformly good lot, which they were not, as it was late in the season before they could be purchased. They were of all shades of color in the face, from pure white to jet black. Some were well bred, but none were pure. Some had no breeding. The majority were grades with more or less of improved blood. The well bred lambs gave much the best returns. A large number had long tails, and many were uncastrated rams. The long tails are very troublesome in case of scouring, and the neglect of castration is an egregious blunder, as this class of lambs do not feed well, are dull of sale and can only be sold at a reduced price. Additional particulars regarding growing the rape, and feeding it off are given in the report of 1890.

Cost of Growing Rape. The following is an estimate of the cost of growing an acre of rape, based upon our own experience. The estimate is made on the supposition, that the rape follows rye, which is our favorite method of growing it here :

1 Plowing	$2 50	Farmyard manure	$15 00	
3 Harrowings	60	Drawing and spreading	4 87	
1 Rolling before sowing	25			
Making the drills	75		$19 87	
Drilling in the seed	30	One-fifth manure allowed for the rape		3 97
Rolling after sowing	25			
Cultivating, four times	2 00	Seed, one pound		15
Hand hoeing, twice	1 00			
		Total		$11 77

In this computation the sum allowed as charge for man and team is $3.00 per day, and for man only $1.25 per day. The manure is valued at $1 per load in the barnyard and it is assumed that 40 per cent of the manure would be exhausted the first year, of which at least 20 per cent would be returned to the land. It should also be noted, that in damp weather, it is not necessary to roll the drills after the seed has been sown. It is assumed that all the labor is hired, both of man and team. The actual cost to the farmer would be much less than the sum indicated.

The rape draws plant food largely from the air and from the sub-soil, and as it is a gross feeder, it fills the soil with rootlets, which improve the mechanical texture and enrich it in their decay. It is also fed off upon the soil, which further tends to the enrichment of the same. It is, therefore, fair to infer that the land is considerably richer in available plant food after the rape has been fed off, than it was before it was grown.

RESULTS. We have then as results the following: (1) $16.80 as the feeding value of the rape, or a return of $5.03 per acre over the cost of tillage. This sum will vary with the season, and the price of mutton. (2) The thorough cleaning of the land, which is about as effectual as though it had been summer fallowed. (3) The value which will be obtained from the increase in the good crops which are grown after the rape. It will also be noticed, that the value of the rye grown the same season, has not been included in the above statement.

GENERAL NOTES. Rape is not a suitable food for milch cows in the dairy, as when they feed upon it the milk becomes strongly tainted. It is a good food for pigs and they are fond of it. It has been claimed, that sheep should be folded upon the rape in order to secure a more even distribution of the manure. We have no experience on this point, but it will probably be found that the sheep will keep healthier when they have more liberty, and are allowed to lie at night upon ground which has a sward upon it.

There is much yet to be learned regarding the growth of rape in Ontario. We have yet to determine, whether flat or drill cultivation is preferable, whether it will repay the labor of thinning, and if so, to what extent, and whether food adjuncts may be added while it is being pastured of such a character as to obviate all danger that may arise to digestion, while feeding on the rape. We have carried on various experiments the past two seasons, which are referred to more or less briefly in the last annual report, but no conclusions have as yet been arrived at, that may be regarded as definite or final.

There is great room for the extension of the rape industry in Ontario. On the supposition that one acre of rape will fatten ten head of lambs, which is a very moderate calculation, if but 100,000 acres of rape were grown yearly, we could then fatten annually 1,000,000 head of lambs. This acreage would not be more than the one one hundred and fourteenth part of the arable land in Ontario.

(31) EXPERIMENTS IN GROWING MILLET, MILLO MAIZE AND KAFFIR CORN.

Of these crops 14 plots were grown. Each plot was one one-hundredth of an acre in size. The effort was made to obtain a larger number of varieties but we were only able to procure those described below. The soil was a light, clay loam, of gravelly tendency. The seed was sown broadcast June 13th. Each variety was sown in duplicate at the rate of one bushel of seed for one plot and two and one-half bushels for the other.

TABLE L. gives the average of the duplicate plots:

Varieties.	Average yield per acre.
White Millo Maize	10.33 tons
Golden Wonder Millet	9.24 "
Kaffir Corn	8.30 "
Common Millet	8.11 "
Hungarian Grass	7.40 "
Yellow Millo Maize	2.72 "
Large African Millet	1.65 "

The Millo maize, which heads the list in point of yield did not mature, and the same may be said of Kaffir corn, Yellow Millo maize and large African millet. The season seems too short for them. The germination of the seed of these crops was so imperfect that the results must be accepted with some caution as safe guides unless comfirmed by future experiments. The Golden Wonder Millet, which stands at the head of the list of millets, is very promising. It is a strong grower and the heads are very long.

(32) CLOVER, COMPARATIVE TEST OF VARIETIES.

Sixteen plots of clovers were grown embracing eight varieties, each of which was sown along with a crop of barley. The varieties include the following: White Clover, Bokheara, Alsike, Common Red, Lucerne, Mammoth Red, Crimson and Welsh. As they were not sown until the spring of 1891 (May 15th), no comparative yields of much value have as yet been obtained. In the case of the Crimson Clover a fair crop was produced. Another year will furnish results which we hope will prove valuable.

(33) EXPERIMENT IN GROWING WHITE OR TABLE MUSTARD.

Two plots were grown. In size they were one-twentieth of an acre. One plot was sown broadcast and the other in rows. The rows were 15 inches apart and were on the level. That sown in drills grew more and matured earlier. The primary object of growing the mustard was to ascertain whether the seed could be successfully and profitably grown here. We refrain from expressing a decided opinion until further experiments have been conducted, as we dò not know now whether trouble may not arise from the seed remaining in the land. It may be mentioned here that 75 pounds of good seed were obtained, which is at the rate of about 750 pounds per acre.

(34) GRASSES GROWN SINGLY. (36) GRASSES GROWN IN MIXTURES.

For the results of these experiments see Report of 1890, page 181.

GRAIN EXHIBIT.

A large grain exhibit was made at Toronto, Guelph and London at the exhibitions held in these places in the autumn of 1891. The following is an approximate summary of what it comprised :

Winter wheat, 60 varieties; spring wheat, 70; barley, 70; oats, 120; pease, 44; corn, 86. Total, 450.

Nearly all of these grains were shewn in the ear except the peas and corn and were grown during 1891. The greater portion of them represented the third year's growth from seed imported from various countries in Europe, Africa, Asia, Australia, New Zealand and the United States.

The grain in the 500 sample jars represented the seed of this year's growth, and also some of the varieties of grain as originally imported from those countries. The corn represented the varieties grown at the Station during the present year.

II. LIVE STOCK EXPERIMENTS.

These include 12 experiments conducted during the present year, 4 with cattle, 5 with sheep and 3 with swine. All the food fed to the animals in these experiments was accurately weighed and accounted for, except that portion of it which the animals gathered when pasturing, and which it is impossible to estimate with absolute precision Bulletins have been issued on some of these experiments. In such instances we give these with certain additions as they give the facts in a summary way. The results of all these experiments which have been completed are given below :

(36) CORN ENSILAGE FOR MAKING BEEF.

This experiment began on December 11th, 1890, and closed May 6th, 1891. It thus covered a period of 146 days.

The chief of the objects of the experiment were (1) to ascertain the relative value of the following rations for making beef, viz., ensilage and meal, ensilage, hay and meal and roots, hay and meal; and (2) to ascertain the cost of making beef when the values of food and meat are both considered. The animals selected were fairly good Shorthorn grade steers. They were purchased by Mr. J. E. Story, the farm foreman, and brought to the farm Sept. 12th, 1890. They were pastured on rape for several weeks and during this period made gains that were satisfactory. They were put into the stable on November 13th, and the experiment proper commenced on Dec. 11th. The six animals selected for the same were chosen with an eye to uniformity in all essential characteristics, and were a fair average of the whole lot purchased.

PERIOD OF PREPARATION. Two weeks prior to the commencement of the experiment the steers were divided into three groups, with two animals in each group. They were placed in double stalls, each group occupying the same stall. They were then fed on the respective rations given to them during the experiment proper, the object of which was to accustom them to the new diet.

FOOD AND FEEDING. The animals in group one were fed all the ensilage they would eat clean, and the aim was to give them 12 lb. of meal per day per animal. Those in group two were given 30 lb.. of ensilage per day, the same amount of meal as the animals in group 1, and all the cut hay they would consume. With the animals in group 3, the aim was to give them 45 lb. of sliced roots per day, the same amount of meal as was given to each of the other groups, and all the cut hay they would consume. The hay consisted of timothy and clover, and the roots of turnips and mangels. The meal consisted of equal parts by weight of peas, barley and oats ground.

The foods fed to each group were mixed at the time of feeding, and were given in three feeds per day. They drank water in the stalls virtually at will.

FOOD EATEN. The animals in group one consumed each per day 57.47 lb. ensilage, and 11.72 lb. meal. Those in group two consumed on an average 30.6 lb. ensilage, 11.13 lb. meal and 9.3 lb. hay. Those in group three consumed 43.07 lb. roots, 11.12 lb. meal and 11.22 lb. hay.

WEIGHTS OF THE ANIMALS. Fasted weights were used both at the commencement and at the close of the experiment. In the fasting, food was withheld after 6 p.m., after the evening meal had been given, until after the animals were weighed at 9 o'clock the following morning. At the commencement of the experiment the actual fasted weights were used, and at the close of the same an estimate of the probable loss through fasting was deducted from the natural weights of the animals. The estimate of the loss of weight was based on the shrinkage through fasting of five steers when sold 13 days after the close of the experiment. This estimate was rendered necessary through the illness of one of the steers in group one, which led to the closing of the experiment before the time intended. Natural weights were taken frequently throughout the experiment, for the reason, among others, that in case of mishap we would have data for calculations. It may be mentioned here that the average shrinkage in weight from fasting was 41 lb.

TABLE LI gives a summary and an analysis of the weights of the animals in the respective groups.

———	Group 1.	Group 2.	Group 3.
	lb.	lb.	lb
Weight at commencement	2,789 0	2,735 0	2672 20
Weight at close	3,344.1	3,183.7	3,209 7
Increase per group	555.1	448.7	537.7
Average daily increase per group	3.80	3.07	3 68
Average individual increase	277.55	224.35	268.85
Average individual daily increase	1.90	1 53	1 84

It will be observed that the most rapid daily gains were made by the animals in group 1, and the least rapid by those in group 2. It is proper to state here, that No. 2 animal of the second group did not appear to thrive equally with the other animals throughout the experiment.

ESTIMATED VALUE OF THE FOOD. The meal, the roots and the hay were estimated at the current market values in Guelph, less the cost of marketing from an Ontario farm under average conditions. The home value put upon the oats therefore was 24½ cents per bush., peas 47 cents, barley 38 cents, roots sliced 8 cents per bush., and hay when cut $5.00 per ton. The price paid for hay at that time was very low. The corn ensilage was valued at $1.75 per ton. Six cents per hundred pounds were allowed for grinding the grain.

TABLE LII gives the financial results of the experiment.

———	Group 1.	Group 2.	Group 3.
	$ c.	$ c.	$ c.
Value of animals at commencement of test	111 56	109 40	106 88
Cost of food	42 92	41 45	51 75
Cost of attendance	6 08	6 08	6 08
Total cost	160 56	156 93	161 71
Value of animals at close of test	183 93	175 10	176 53
Value of manure	13 14	13 14	13 14
Total value	197 07	188 24	189 67
Gain	36 51	31 31	24 96
Gain per cent. on investment	22.7	20.0	15.2

At the commencement of the experiment the animals were valued at 4 cents per pound live weight, which was the average market price paid for steers of this class at the time. The cost of attendance was computed on the assumption, that one person at $25.00 per month would feed and care for 40 head under ordinary conditions. At the close of the experiment the animals were valued at 5½ cents per pound live weight, as they were sold 13 days later for 5⅝ cents per pound. It was estimated that 15 lb. of straw per animal was used per day, as bedding, and this was charged as worth $1.50 per ton in the barn. The quantity of manure made was estimated at 75 lb. per day, per animal, and it was valued at $1.50 per ton, as standard value of manure made from ordinary stock is usually put at $1.00 per ton in the yard. From the sum thus obtained the value of the straw was deducted to obtain the figures given in the table.

TABLE LIII gives the financial results without taking into account the items of cost of attendance, bedding and manure.

———	Group 1.	Group 2.	Group 3.
	$ c.	$ c.	$ c.
Value of animals at the first of the test and the cost of food throughout	154 48	150 85	158 63
Value of animals at the close of test	183 93	175 10	176 53
Gain	29 45	24 35	17 90

It should be understood that in all probability a profit has already been made on the marketable food used, providing it has been grown upon the farm, as in this experiment the food was charged at the full market values less the cost of marketing from an average Ontario farm. This profit will be represented by the difference between the cost of growing and marketing and the market value put upon the food. On May 8th the supply of ensilage was exhausted in the silo at the farm stables. It was then brought from the silo at the dairy barn. In the bottom of this silo some late planted and immature corn had been put which was quite acid, and it was from this source that the ensilage was obtained. On May 10th one of the steers in group 1 was observed to be off his feed. On the 11th he was observed to scour badly. The ensilage was at once withheld and he was put on a diet of dry hay. As the other animal in this group manifested symptoms very similar a day or two earlier, and recovered on his diet being changed to dry hay, and gave no further trouble when put back again on a diet of ensilage, we naturally looked for a similar result with this animal, but in this we were disappointed. He continued to grow worse and finally Dr. Grenside, the veterinarian of the station was called in on May 13th. The steer died on the 14th. The following is the report of the veterinarian furnished at our request:—"The experimental steer reported to me as sick on Thursday, 13th May. Found his extremities, ears and skin cold; pulse very frequent and weak; high fever; temperature 107° Fahrenheit; complete loss of appetite. No active evidence of pain shown in the way of restlessness on punching. Small quantities of liquid fæces passed as usually noticed in inflammation of the bowels. Prescribed usual treatment without any apparent benefit. The animal died next day. Post mortem revealed well marked diffuse inflammation of the inner coat of the bowels, mucous membrane and fourth compartment of the stomach. Substances of an irritating character in their passage through the digestive tract would be likely to cause such a form of inflammation. An examination of the ensilage that had been fed to this animal showed it to be exceedingly sour and pungent to the taste, in fact so much so, that one could readily understand its acting as an irritant poison if given in sufficient quantities, especially if not fed with hay or straw as part of the ration, which would tend to lessen its irritating effects upon the mucous membrane." The five remaining steers were sold on May 19th for shipment to England. The price obtained was 5⅞ cents per pound, fasted weight. The sum received for them was $481.46. The gain therefore on the investment from the commencement of the experiment, not taking into account the cost of attendance, bedding and value of manure, and charging the food of the dead animal and his original value against the experiment was $9.01; when the cost of attendance and bedding, and the value of the manure are considered the gain is $32.67. The difference paid for the five animals when purchased September 12th, 1890, and when sold May 19th, 1891, was $243.96 or $6.46 more than twice the sum paid for them.

Conclusions. The following are some of the more important of the conclusions to be drawn from the experiment.

1. That the total gain on the investment without taking into account attendance, labor and manure was $71.60, and the average gain on each animal was $11.93. When these items are included the total gain is $92.78 or an average of $15.46 on each animal

2. That in this experiment the cost of making 100 lb. of increase in live weight from the ration of ensilage and meal was $7.73, from that of ensilage, hay and meal $9.23, and from the ration of roots, hay and meal $9.62.

3. That in this experiment an average individual daily gain was made of 1.76 lb., at an average cost of 15.5 cents for the food fed.

4. That it is hazardous to feed a full ration of very sour ensilage to animals that are being fattened when it is fed in conjunction with meal only.

5. That in this experiment the value of the animals for beefing purposes was increased by the fattening process an average of 1½ cents per pound live weight, from its commencement to its close, and 1⅞ cents per pound from its commencement to the time of the sale of the animals.

(37) FEEDING SHORN AND UNSHORN LAMBS IN WINTER.

This experiment began on January 6, 1891, and closed on April 29, following, thus covering a period of 113 days. The objects of the experiment include the following, viz.: 1. To ascertain whether shorn lambs or unshorn lambs will give the best returns for the food consumed in winter. 2. To ascertain the relative gains that will result from liberal feeding at such a time. 3. To ascertain the cost of feeding lambs for fattening purposes in the winter season on the ration used in this experiment. 4. To ascertain the adaptability of the work to the conditions of Ontario.

THE ANIMALS SELECTED. During the early part of October, 1890, as stated more fully in the report of the College for that year (pp. 130-132), 537 sheep and lambs were purchased and brought to the farm to be fattened; of these 505 were lambs. From the lambs 100 were selected and shorn early in October with a view to fattening them for the British market during the winter months. The particulars relating to these will be fully given in a Bulletin which is the complement of this one. Subsequently 20 others were selected, and of these 10 were shorn, the remaining ten retaining their fleeces until after the close of the experiment. The animals used in this experiment were therefore the second choice, as 100 had previously been selected from the whole lot. They were good grade lambs of both sexes, but the males were all wethers. The breeding was mixed, no accurate particulars were obtained regarding it, but judging from the appearance of the animals they were the offspring of the common ewes, and from pure rams of the various long and short wool varieties used in the country, as the Leicester, Cotswold, Oxford Down, Shropshire and Southdown, but the Leicester blood evidently predominated. Some of the animals would have passed for pure Leicesters. They were in fair condition at the commencement of the experiment, so much so that they would have readily sold at that time for the American market at the price at which they were valued, viz., 5 cents per pound live weight.

PERIOD OF PREPARATION. At the close of November, 10 of the lambs were shorn. They were all then placed in the same pen on December 2, and were fed together until January 6, when the experiment proper commenced. The long preparatory period to which they were thus subjected gave the animals composing the two lots an even chance on entering the experiment. At the commencement of this preparatory period the weights were as follows:

	Aggregate weight.	Average weight.
20 lambs, shorn and unshorn	1,936.50 ℔	96.83 ℔
10 lambs, unshorn	1,018.50 "	101.85 "
10 lambs, shorn	918.00 "	91.80 "

The wool from the 10 shorn lambs weighed 45.31 pounds and was sold at 13 cents per pound. In development therefore, there was a slight advantage in favor of the 10 unshorn lambs.

CONDITIONS GOVERNING EXPERIMENT. 1. The unshorn and shorn lambs designated groups 1 and 2 respectively, were put in separate pens on January 6, when the experiment commenced and were kept in these until it closed. These pens were in a closed shed, with ceiling 10½ feet high, and hay loft overhead. The pens were 24⅜ feet long and 13½ feet wide. The length of manger was 20½ feet, which gave practically 2 feet to each sheep, and this was found to be sufficient. In the rear and front of each there was a window, and also in front were double doors, each 3 feet wide and cut in two across the centre. The top doors were kept constantly shut except on fine sunny days. The bottom doors were kept constantly open for the unshorn lot day and night, unless when very stormy, and for the shorn group they were kept open only in fine weather in the cold months. The pens opened into yards facing the south west. These yards were 28¼ feet long and 3½ feet broad. To have the yards facing the south or south-east would be preferable, but in this instance the play of west and south-westerly winds is arrested by the barn. 2. Both groups were given the same kinds of food and the same quantities throughout the experiment, except in the case of hay, of which they were given all they would take. Of this, however the two groups took the same amount. 3. The lambs in each lot were weighed monthly throughout the experiment, except in the case of the last weighing, which of necessity had to be made before the month had expired, as these lambs formed part of the lot shipped to England early in May.

Table liv. Weights of the animals at different periods of the experiment.

GROUP I.

Weight of each animal at—					Increase during the experiment.
Commencement.	End of 1st period. (31 days.)	End of 2nd period. (28 days.)	End of 3rd period. (31 days.)	End of 4th period. (23 days.)	
lb.	lb.	lb.	lb.	lb.	lb.
132.5	141.5	156.0	172.0	184.0	51.5
116.0	124 5	139.0	157.0	162.5	46.5
105.0	112.5	126.0	141.0	149.0	44.0
103.5	113.0	127.0	142.0	147.5	44.0
110.5	119.0	135.0	147.5	153.5	43.0
130.0	140.0	154.5	169.5	171.5	41.5
117.5	123.0	136.0	144.0	158.0	40.5
104.0	104.5	124.5	136.5	144.5	40.5
107.0	109.5	126.0	139.5	146.0	39.0
93.0	110.0	110.5	121.5	129.0	36.0
Totals.... 1119.0	1197.5	1334.5	1470.5	1545.5	426.5

GROUP II.

Weight of each animal at—					Increase during the experiment. (113 days.)
Commencement.	End of 1st period. (31 days.)	End of 2nd period. (28 days.)	End of 3rd period. (31 days.)	End of 4th period. (23 days.)	
lb.	lb.	lb.	lb.	lb.	lb.
94.0	112.5	131.5	155.0	164.0	70.0
111.0	121.0	141.0	160.0	169.0	58.0
105.5	114.5	128.5	144.5	151.0	45.5
104.0	116.0	131.0	140.5	149.0	45.0
107.5	115.0	127.0	139.5	148.5	41.0
90.0	94.0	108.5	121.5	129.5	39.5
94.0	97.0	111.0	125.5	130.0	36.0
103.5	119.0	117.0	132.0	139.0	35.5
113.0	114.0	125.0	137.0	144.0	31.0
106.0	112.5	118.5	132.0	132.0	26.0
Totals.... 1028.5	1115 5	1239.0	1387.0	1456.0	427.5

It will be observed that there is a wide difference in the gains made by individua lambs. The highest increase made by one animal during the experiment was 70 ℔, a daily gain of .62 ℔. The lowest gain was only 26 ℔., a daily gain of but .23 ℔. The five lambs in each group which gave the highest increase in weight gained .43 ℔. per day, and the five which gave the lowest increase gained but .32 ℔. per day. The profits therefore in all probability came largely from the lambs which made the best daily gains. But to be quite clear on this point, we would require to know the food consumed by each lamb. The marked difference in the gains, however, emphasises the importance of making careful selections when lambs are to be fattened.

TABLE LV gives a summary and an analysis of weights.

———	Unshorn lambs.	Shorn lambs.
	lb.	lb.
Weight at commencement	1,119.000	1,028.500
Weight at close	1,545.500	1,456.000
Increase per group	426.500	427.500
Average daily increase per group	3.774	3.783
Average individual increase	42.650	42.750
Average individual daily increase	.377	.378

The average daily gain of the lambs in the two groups was practically the same, there being but one pound of difference in favour of the shorn lambs. This difference would probably have been more had the lambs been shorn earlier in the season. The average daily gain of each lamb was .38 lb. or nearly two-fifths of a pound per day.

TABLE LVI gives the financial results of the experiment.

———	Unshorn lambs.	Shorn lambs.
Value of animals at commencement of test	$55 95	$51 42
Cost of shearing		50
Cost of food	31 45	31 45
Cost of attendance	2 82	2 82
Total cost	$90 22	$86 19
Value of animals at close of test	$108 18	$101 92
Value of wool		5 93
Value of manure	8 48	8 48
Total value	$116 66	$116 33
Gain	26 44	30 14
Gain per cent. on investment	29.31	34.97

The lambs were valued at five cents per pound at the commencement of the experiment, as stated elsewhere. At its close they were valued at seven cents per pound, as we were offered this sum by Mr. L. O. Barber, live stock dealer, of Guelph. It is only fair to state here that this is more than has hitherto been paid for lambs at that season of the year. The offer was refused, as we desired to ship some of them to Great Britain, along with a number more fed for that purpose, to make the number so shipped an even hundred. Full particulars are given regarding the feeding of these lambs and the shipment of the same in the next bulletin.

The manure was valued at $\frac{3}{4}$ cents per day per lamb. This estimate is based upon the results of an experiment conducted by Prof. I. P. Roberts, of Cornell University experiment station, New York, wherein the value of the manure made from one sheep per day is reckoned at one and a half cents. For reasons which we do not stay to mention now, we consider the estimate referred to too high to apply to Ontario conditions. We have therefore put the value of the manure as stated above.

The cost of attendance was reckoned on the basis that one man would feed and care for 400 lambs per day under ordinary conditions when the food has all been made ready. This estimate is probably very near the truth. At all events it is not an extravagant one, as anyone who has engaged in this work must know very well. It will be observed that the gain on the shorn lambs was $3.70 more than on those unshorn. But too much should not be made of this at present, as in the offer for the lambs no distinction was made between those shorn and unshorn. It is important, however, to note that the shorn lambs shipped better than the unshorn, as will be more fully stated in the bulletin relating to the whole lot which were exported to Great Britain. The total average gain on the investment during the 113 days which the experiment lasted, viz., 32.07 per cent., is a very satisfactory one.

A few of the lambs in this experiment were sent to England, to take the place of others in the larger experiment which were not considered suitable, hence the difficulty of giving the actual returns realised. Should the price offered for these lambs be considered unduly high, the reader can estimate values based upon the current prices in his neighborhood.

CONCLUSIONS. The following are the chief of the conclusions to be deduced from this experiment:

1. That good grade lambs when being fattened in winter will make satisfactory gains on a daily ration of 1.90 lb. grain and bran, 1.91 lb. hay and 5 lb. roots, or a total of 8.81 lb.

2. That lambs when properly fed and cared for in the winter the ration being the same as that used in this experiment, will make an average gain per day of .38 or nearly 2-5 lb.

3. That good grade lambs may be made to gain .38 lb. per day at an outlay of 2.78 cents per day for food, when the prices are the same as those charged in this experiment.

4. That there is some advantage to be derived from shearing lambs in autumn for winter feeding, although the extent of the advantage was not very marked in the experiment.

5. That about 12 per cent. represents the relation which the value of the wool when shorn bears to that of the animal under conditions similar to those which relate to this experiment.

6. That when good grade lambs are fattened in winter, the prices of mutton and food being the same as in this experiment a profit of 32.07 per cent. may be realised on 113 days feeding.

7. That as the lambs in this experiment cost $3.76 when laid down at the farm and would bring $10.80 per head at the close of the experiment, the advance in value was $7.04 per head, that is to say, they were worth nearly three times as much as they cost in the first place.

8. Inasmuch as the opinion has very generally prevailed among farmers that lambs cannot be fattened in the winter at a profit, in view of the above this opinion should be carefully reconsidered.

(38) FATTENING LAMBS FOR THE BRITISH MARKET.

This experiment began on Oct. 24, 1890, and closed on April 24, 1891, seven days before the lambs were shipped to Britain. It therefore covered a period of 182 days. The principal objects of the experiment were: 1. To ascertain whether lambs can be fattened at a profit in winter for the English market, in the hope of adding anothe important industry to the agriculture of Canada. 2. To ascertain the suitability of the average grade lambs of Ontario for the said market. 3. To ascertain whether autumn shorn lambs are the more suitable for spring shipment.

THE ANIMALS SELECTED. The lambs from which those intended for shipment were selected were purchased by Mr. J. E. Storey, the farm foreman, in the eastern part of Ontario. There were purchased in all 505 grade lambs. Of these 312 came from the counties of Lanark and Carleton, 145 from Pontypool in the county of Durham, and 48 from Wellington and the adjoining counties. The last lot mentioned reached the farm during the latter part of September, those from Lanark and Carleton on October 4, and those from Pontypool on October 18. The lambs were a mixed lot, and take them all in all were somewhat below the average, as when they were purchased good lambs were hard to get. They were evidently the offspring of sires of the principal breeds which we have in the country. Each lot of lambs was turned into the rape fields and fed upon the rape until October 20th, when one hundred of them were chosen for the experiment. In selecting, compact, medium-sized animals were chosen, and especially those having dark faces so far as they could be obtained. Notwithstanding, a considerable number were not of this class. The most ungainly ones, therefore, were counted out, and but ninety of the lambs were included in the experiment proper. Interesting particulars regarding those counted out will be appended in the annual report.

Conditions Governing the Experiment. The lambs selected were shorn Oct. 22 and 23. On October 24 they were all weighed separately and the weights recorded. They were then kept housed in sheds in cold and rough weather, and were allowed to pasture on the rape in the day time when the weather was fine, until November 21. After that date they were confined to the sheds and the yards in front of them. The sheds, or rather shed, consisted of one large building with ceiling 10½ feet high and hay loft overhead. This building was divided into compartments about the same in size as those described in the previous bulletin. The yards in front were also similar, and the general treatment of the lambs as to confinement or exposure was about the same as with those in the aforementioned bulletin. Some sixteen or seventeen animals were kept in each compartment. We considered them a little overcrowded, especially when they were feeding.

Food and Feeding. From October 24, the date of the first weighing, until November 21, they were fed hay and a limited amount of grain in addition to the rape which they secured in the field. The grain ration was gradually increased during this period. From November 21, 1890, until April 24, 1891, when the experiment closed, they were given a ration consisting of grain, roots and hay. The grain fed was accurately weighed. The whole amount consumed was—oats, 12,408 lb. oat screenings 1,062 lb.; peas, 4,712 lb.; bran, 1,777 lb. A small amount of damaged wheat fed is included in the reckoning for the peas. The ration thus formed was practically as follows: Oats, 7 parts; oat screenings, 1 part; peas, 3 parts; and bran, 1 part by weight. The grain was fed in the unground state. The quantity of the grain fed was increased from time to time, and the average amount consumed per day by each animal throughout the experiment was 1.3 lb. The lambs were given all the hay they would eat. It consisted of clover and timothy, but the principal portion was clover. The hay fed in this experiment was not weighed, but as another experiment was being carried on simultaneously in the same building, with lambs of similar character and very similarly fed, in which the hay ration was accurately weighed, we have used these weights in estimating the amount of hay consumed in this experiment. This estimate would put the whole of the hay consumed at 13.9 tons, and the average amount consumed per day by each animal at 1.91 lb. The roots consisted of turnips sliced in strips before being fed. The amount at first given to each animal per day was 1 lb. This was increased from time to time until February 12, when they were given 5 lb. each per day, and this was the quantity given until the close of the experiment. The whole amount of the roots fed therefore was 50,301 lb., or 838⅓ bush.; or an average per day for each animal of 3.07 lb. They were supplied with water from taps in the pens.

Estimated Value of the Food. The food was estimated at the current market values in Guelph, less the cost of marketing from an Ontario farm under average conditions. The home value put upon the food by this mode of reckoning was: Oats, 34½ cents per bush.; peas, 52 cents; bran, $14 per ton; roots sliced, 8 cents per bush; and hay, $4.50 per ton.

Table lvii gives a summary and an analysis of weights.

—	Pounds.
Weight at commencement	7,636.500
Weight at close	12,150.000
Weight of increase	4,513.500
Average increase per head	50.150
Average daily increase per head	.275

The average weight of each lamb at the commencement of the experiment was 84.85 lb., and at its close 135 lb. The average gain per month, therefore, was 8.25 lb. The highest average gain per month was 11.70 lb., and the lowest 5.40 lb.

TRANSPORTATION. The lambs were put on board the cars on May 1. The farm foreman took charge of them as far as Montreal, put them on board the steamship Lake Superior *en route* for Liverpool, and secured a competent feeder to care for them. The whole number of lambs sent was 100. To make up this number the 10 lambs described in group 1 of the previous bulletin were added. Of these 5 were left with long wool and 5 were shorn just before shipment. They were thus chosen first, to make the number exactly 100, and second, that some lambs might be included newly shorn and others possessed of long wool. The best of the lambs in these two groups were kept at home to be fed for show purposes. They have since been sold to be shown at the approaching fat stock show in Chicago. The shipment reached Liverpool in good condition and without the loss of a single lamb. The autumn shorn lambs stood the voyage better than those shorn in the spring, and also better than those not shorn, as the second lot mentioned suffered from cold and the third from heat. It may also be mentioned here that the autumn shorn lambs occupied considerably less space than those in full fleece when on board the vessel, and on their arrival they were in more attractive form than either of the other lots.

DISPOSAL OF THE LAMBS. They were consigned to Messrs Baxter and Williamson, live stock commission agents, Liverpool, to be disposed of. Mr. G. F. Frankland, ex-alderman, Toronto, who was in Liverpool at the time, was also authorised to take notes of and report upon the same. Mr. Frankland reported: 1. That the lambs as a whole arrived in excellent condition. 2. That English buyers pronounced them one of the best lots of lambs ever sent from Canada to England. 3. That they killed well, dressing 68½ lb. each, or a little more than half the live weight, which "is considered a good return, more especially after a journey of over 3,000 miles by land and sea; and 4. That when dressed the meat brought 17 cents per pound, "the highest quotation" at the time in the wholesale market.

TABLE LVIII gives the financial results of the experiment.

——	Values.
	$ c.
Value of the animals at the commencement of the test	362 73
Cost of shearing	4 50
Cost of food	339 62
Cost of attendance	40 95
Cost of shipping to England	375 21
Total cost	1,123 01
Value of lambs in England	1,061 08
Value of wool	47 50
Value of manure	122 85
Total value	1,231 43
Gain	108 42
Gain per cent. on investment	9 65

The average value of the lambs at the commencement of the experiment was $4.03, and the average price for which they were sold in the English market was $11.79. The average advance, in value, therefore, was $7.76. The cost of attendance was estimated as in the previous bulletin on the assumption that one man would care for 400 lambs. The autumn shorn wool averaged 4.06 lb. per fleece unwashed, and sold for 13 cents per pound. The value put upon the manure as in the previous bulletin was ¾ ct. per animal per day, one-half the amount fixed upon by Professor Roberts, of Cornell University, in a bulletin issued during the present year.

The cost of transportation and sale of the lambs was $375.21, or $4.17 per head. This was considerably more than the average outlay, which experienced shippers put at from $2.50 to $3.00 per head. This arose in part from the smallness of the shipment, which of necessity would involve more expense relatively than when done on a large scale. It is confidently believed that the cost of transportation and sale will be much reduced in the next shipment. If, in this shipment, $2.75, which is about the average cost, were charged against the lambs for shipment and sale, the financial result would be as follows:

Total cost of lambs	$995 30
Total value as before	1,231 43
Net gain	236 13
Gain per cent on the investment	23.72 per cent.

It is the intention to repeat the experiment the coming winter and spring.

Conclusions. The leading conclusions to be drawn from this experiment include the following:

1. That lambs can be fattened successfully in winter in considerable numbers in one building when subdivided into moderately sized groups.

2. That average grade lambs will fatten satisfactorily in autumn and winter when fed daily a ration consisting of some rape for a time, 1.30 lb. grain, 1.91 lb. hay, and 3.07 lb. roots.

3. That average grade lambs when fed in winter similarly to those in this experiment will make a gain of 50 lb. in six months, that is to say, .275 lb. per day, or 8.25 lb. per month.

4. That with the prices charged in this experiment, average grade lambs can be fattened in winter at a daily cost of 2.07 cents for food.

5. That autumn shorn lambs are the most suitable for spring shipment, as they occupy less space on shipboard, they better resist changes of weather, and present a more attractive appearance in the market.

6. That it will pay to ship lambs to Britain at an advance of 2 cents per pounds live weight, over what can be obtained here, but the price obtained in Britain last season, was not quite equal to 7 cents per pound, live weight, in Ontario.

7. That there is room for a large and profitable trade in fat grade lambs between Canada and Britain, providing they are shipped early in the season.

Observations. It should be noticed that the lambs when selected were not equal to the average of the lambs in the central and western sections of the Province. This will be at once apparent if we refer to the average weight of the lambs when the experiment commenced. They weighed but 84.5 lb. each on October 24th, although by that time they had fed fully three weeks on the rape. The lot of lambs purchased for feeding at this station in 1889 averaged 96 lb. on October 10th, without having been on rape at all. If then, with lambs below the average of the western Ontario lambs, results so encouraging can be reaped, there is good hope that in the future these results may be exceeded.

It may also be claimed by those who are disposed to place but little value upon the manure, that the experiment resulted in an actual loss of $14.43. This would be true providing, first, the full cost of transportation, viz, $4.17, were to be charged against the lambs, and second, that no value is put upon the manure. To reckon thus would manifestly be unfair in both instances. The cost of transporting the lambs and disposing of them was of necessity above the average outlay usually incurred in such work. There was extra cost in providing a special feeder and also someone to forward facts regarding the transaction.

The only way of avoiding this would have been to have sold the sheep outright to a dealer, in which case we would not have obtained valuable information regarding the transportation and disposal of the lambs. The manure of lambs fed heavily as these were with a grain ration is undoubtedly of much value. There is real difficulty, however, in the present state of our knowledge, in fixing a value upon it. The data bearing upon the subject is meagre, but we hope soon to remove this barrier through work carried on at our station. Professor Roberts has done some good work in this direction, and that is our reason for using the results of his labors in affixing a value to the manure made by the lambs. Professor Roberts ascertained by actual test the amount of manure made by lambs fed upon a heavy ration during certain of the winter months. He then was enabled, by means of chemical analysis, to fix a value on the manure, based upon the market values of commercial fertilizers in the State of New York. This gave the value of the manure as 1½ cents per lamb per day. It was thought that this estimate was too high to apply to Ontario, owing to a difference in conditions and to the further reason that we sought the real value of the manure, rather than its value as compared with that of commercial fertilisers. We therefore put the value of the manure made per lamb per day as ¾ cents. This in all probability is approximately correct, which will be still further apparent when we compare the manure made from lambs with that made from bullocks. When these two items are considered, herefore, the gain on the transaction without the manure is $113.28, and with the manure $236.13.

In other words, the gain upon each lamb is fully $2.00 per head, even though the value put upon the manure were considerably reduced. Of the whole lot of 100 lamb, set aside to be fed for the British market but 90 head were sent, as stated in the bulletin.

The remainder were not considered suitable owing to the defects of form and to their ack of feeding qualities. After a time they were singled out and fed in a separate compartment. They were sold to a local dealer on at an average price of $ It is thus apparent that with our grade lambs as with our grade cattle, only a certain portion of them are suitable to feed for export. It would not perhaps be incorrect to say, that of all the lambs grown in Ontario, not more than the half thereof are fit for this purpose, owing to the lack of breeding. The character of the lambs should be most carefully considered by those who engage in this work of feeding for the British market.

It is matter of common opinion that a large lot of lambs cannot be fed successfully together in the winter season. That may be true of lambs which feed in one lot, but our experiment makes it evident that a large number may be fed successfully in one building provided they are divided into several smaller lots. The number that may be allowed to feed together successfully, would depend to some extent at least, upon such conditions as the robustness of the lambs, and the character of the shelter and management generally. It is probable that the unfavorable conditions under which large lots of sheep are sometimes fed, is to some extent responsible for the prevalence of the idea that they will not thrive in large numbers. Further experiment, however, will give the requisite information on this point.

The information in our possession in regard to the behavior of the lambs on shipboard is very meagre, and also as to the amount of food consumed during the transit. We hope to be in a position to be able to furnish many interesting particulars regarding the shipment of the next lot, which cannot be given in reference to this one. It is very encouraging however to note the favor with which the lambs were received in England by the trade, and also the high enconiums given them by the press of that country. The *Drovers' Journal* spoke of them in the following terms :—

"These Canadian lambs were from the Ontario Agricultural College Farm, and seldom has a better selection been seen, their condition and quality being all that could be desired. There is reason to believe that a large trade will be done in mutton stock from the Dominion, and certainly stock of similar character to those under notice would at all times command a ready sale here."

The *Canadian Gazette* of July 11th, has the following over the signature of ex-alderman G. F. Frankland, "These lambs arrived here by the Lake Superior on May 16th, and on Sunday, the 17th, I stood near while the Government officer of the Veterinary Department of the Privy Council examined them before they could be offered for sale. What was my astonishment to find out that he picked out one for slaughter. . . The animal chosen turned out finely developed, plump legs, full loins, and good shoulders; indeed, the doctor smiled and said, when it was killed, 'that it would sell for the best Scotch mutton.' . . . After the long journey they dressed 68½ lb. each, making the handsome sum of 17 cts. per pound, the highest quotation in the wholesale market. Of course it must be understood, the skins and tallow, head and pluck are not reckoned in the sale, as they give the market price and sink the offal or absorb it for profit. Let me say a word about black-faced sheep, and how they are appreciated in England. Old butchers tell me they make more lean than the other classes of sheep, and that they sell the most readily and for the highest price."

There is much room for development of the sheep industry in Ontario. The demand for lambs in the United States is good, and if we furnish them at the proper season, there will also be a wide market for them in Britain. We have, therefore, the advantage of two good markets for our lambs, and we may naturally expect the home market to improve with the growth of our cities and the development of manufacturing centres. The latest return from the Bureau of Industries gives the number of sheep in Ontario as 1,693,751. This estimate would allow but a little more than 8 head to each 100 acres of assessed land in Ontario. Every hundred acre farm in the province can sustain at least 12 to 14 head of sheep with no appreciable outlay for food in the summer season, that is to say, from May 1st to December 1st. This province could probably carry as many more sheep as we have at the present time.

We are happily situated for growing sheep profitably. We have access to the two best markets in the world, viz., those of Britain and the United States. The former is free, and the duties barring the way to the latter are by no means prohibitory. Our home market is constantly improving. We can grow suitable food for fattening sheep in finest form, as oats, peas and rape can be grown in any quantity desired. We have excellent foundation stocks, viz., the Leicester grade.

It is to be hoped therefore that the sheep industry will receive greatly increased attention at the hands of our farmers.

(39) Ensilage and Roots as Food Factors in Swine Feeding.

The bulletin, following, gives the results of the second experiment conducted with reference to feeding on the lines indicated. It may be proper to state here that in the first experiment, the results of which were given in Bulletin LIV., the amount of meal given to the animals in groups 2 and 3 respectively was one-third the amount given to the pigs in group 1, while in the second experiment the animals in groups 2 and 3 were given one-half the amount of those in group 1. This change was made because it was found that in the first experiment the meal ration given to groups 2 and 3 was too light relatively compared with that given to the pigs in group 1.

This experiment began on December 4th, 1890, and closed on March 4th, 1891, covering a period of 90 days. The after experiment growing out of it lasted 47 days. Its primary object was the same as that of the experiment the results of which are given in Bulletin LIV, issued October 1st, 1890, viz., to ascertain the value both essentially and relatively of corn ensilage and roots, when used as food adjuncts in feeding swine in the winter season. A second object was to ascertain the cost of making pork at the current market values of the food and pork respectively. A third object was to demonstrate the extent of the loss from feeding swine after they have become fit for slaughter. Several other facts of much interest were brought out in the experiment, as the profits arising from the judicious feeding of swine, the losses arising from feeding them injudiciously, and the influence of corn ensilage and roots respectively on development during the subsequent fattening period.

The Animals Selected. The animals chosen for the experiment were all sired by the same pure-bred Berkshire boar and bred upon the farm. They were divided into three groups, each consisting of three animals, one barrow and two sows. Eight of the nine were the offspring of a high grade Berkshire sow, and were 209 days old at the commencement of the experiment. The ninth was also from a sow of similar breeding, and was farrowed about the same time as the litter already mentioned. They were all in good store condition at the commencement of the experiment. The conditions therefore were very similar.

PERIOD OF PREPARATION. Two weeks prior to the commencement of the experiment the pigs in the different groups were put in separate pens 6 ft. by 10 ft., which was all the room available. They were then fed on the respective rations given to them during the experiment, the object of which was to accustom them to the new diet. Before they were selected for the experiment they had been fed on a meal ration more or less varied and refuse from the College.

FOOD AND FEEDING. The pigs in group 1 were fed all the meal they would eat up clean. They took 14 lb. per day until within ten days of the close of the experiment, when they would take no more than 10 lb. per day. Those in group 2 were fed about one-half as much meal as the pigs in group 1, and in addition all the turnips they would eat without waste. They were given 40 lb. per day until within 28 days of the close of the experiment, when they took 45 lb. per day. The pigs in group 3 were also given about one-half as much meal as those in group 1, and in addition all the corn ensilage virtually that they could utilise. They took 20 lb. of the ensilage per day until within 15 days of the close of the experiment, when the quantity was increased to 25 lb. per day. The aim was to make the quantities of meal given to the pigs in groups 2 and 3 respectively exactly one-half the amount given to the pigs in group 1, but a slight variation was caused by the reduction already noted in the quantity of meal given to the pigs in group 1. The meal ration given was the same in kind throughout and in each instance, and was also similar in kind to that used in the corresponding experiment of the previous year. It consisted of ground oats, ground barley, ground peas and wheat middlings, in the proportions by weight of 1, 1, 2 and 1 respectively. The food was given in three feeds per day. In feeding, water was first poured into the trough in each instance. To the pigs in group 1 the meal was then given; to those in group 2, the turnips, followed by the meal; and to those in group 3 the ensilage, followed by the meal. The ensilage was cut into lengths of about 1½ inches. The quality was not the best, as the corn had scarcely become sufficiently matured when it had to be cut. The pigs only ate the more succulent portions of the ensilage, the other portions were simply chewed. The pigs in group 1 required water additional to that given them along with the food.

ESTIMATED VALUE OF THE FOOD. The various components of the meal ration were estimated at current market values in Guelph, viz.: oats, 38 cents; barley, for feeding purposes, 45 cents: pease, 58 cents per bushel; and wheat middlings, $15 per ton. Eight cents per 100 lb. was allowed for grinding the meal. The price of the meal mixture used was, therefore, practically one cent per pound, which was one-eighth of a cent more per pound than in the experiment of the previous year. The roots were charged at eight cents per bushel, as in the experiment of the previous year; but the corn ensilage, which in that experiment was given a value of $2.50 per ton, was in this one put at $2 per ton, as in our experience in growing corn since that time we have found that it can be grown for a less sum than the price then fixed upon.

FOOD EATEN. Table LIX gives the food consumed (1) by each individual animal daily on an average throughout the experiment, and (2) the whole amount consumed by the pigs in each group:

—	Group 1.	Group 2.	Group 3.
	lb.	lb.	lb.
By each animal	4.53 meal.	2.30 meal. 13.73 turnips.	2.30 meal. 6.93 ensilage.
By each group	1,224 meal.	621 meal. 3,708 turnips.	621 meal. 1,872 ensilage.

WEIGHTS. Table LX gives (1) the total weight of each group (*a*) at the commencement of the experiment, and (*b*) at the close, (2) the increase in weight of each group, (3) the average daily increase of each group, (4) the average individual increase of each group, and (5) the average individual daily increase of each group :

——	Group 1.	Group 2.	Group 3.
	lb.	lb.	lb
Weight at commencement	465.0	442.5	472.0
Weight at close	728.0	606.0	543.0
Increase per group	263.0	163.5	71.0
Average daily increase per group	2.922	1.817	.789
Average individual increase	87.667	54.500	23.667
Average individual daily increase	974	.606	.263

VALUES. Table LXI gives (1) the value of the animals in each group at the commencement of the experiment, (2) the market value of the food consumed, (3) the total value of the animals and food, (4) the value of the animals at the close of the experiment, (5) the increase or decrease in value of the animals at the close of the experiment, as compared with their value at the commencement, with the value of the food fed added, and (6) the average gain or loss per cent. on the investment :

——	Group 1.	Group 2.	Group 3.
	$ c.	$ c.	$ c.
Value at commencement	17 44	16 59	17 70
Cost of food	12 24	11 15	8 08
Total cost of animals and food	29 68	27 74	25 78
Value at close	32 76	25 15	21 72
Gain or loss (—)	3 08	—2 59	—4 06
Gain or loss per cent. on investment	10 38	—9 34	—15 75

The pigs were all valued at $3.75 per hundred pounds live weight at the commencement of the experiment, as this was the price given in Guelph market at the time. At its close the pigs in group 1 were valued at $4.50 per hundred, the market price in the same place at that time. Those in group 2, which were not in prime condition, were valued at $4.15 per hundred, and as those in group 3 were not much improved in condition they were valued at $4 per hundred. The price of pork had advanced in the interval ; hence they were rated a little higher than at the commencement of the experiment.

THE AFTER EXPERIMENT. An after experiment was then commenced March 4 and continued until April 20th, a period of 47 days. Its objects were threefold, viz : to ascertain (1) the results from feeding pigs on a meal ration after they are ready for market ; (2) how those results compare with the results obtained from fattening pigs for a similar period on a similar ration, which had been fed as those in groups 2 and 3 of the experiment ; and (3) the comparative gain or loss from fattening pigs on meal alone, as compared with feeding them on a ration of meal and turnips in one instance and meal and ensilage in another, and then finishing them on a ration of meal. The respective groups were the same as in the experiment. They were all fed on meal similar to that used in the experiment. They were given practically all they would eat ; but while those in groups 2 and 3 took about the same quantity they each consumed much more than those in group 1.

TABLE LXII gives the amount of food consumed during the after experiment.

——	Group 1.	Group 2.	Group 3.
	lb. meal.	lb. meal.	lb. meal.
By each animal daily	3.07	6.14	6.14
By each group in period	433.	866.	866.

TABLE LXIII gives the weights during the after experiment.

——	Group 1.	Group 2.	Group 3.
	lb.	lb.	lb.
Weight at commencement	728.	606.	543.
Weight at close	757.	737.	763.
Increase per group	29.	131.	220.
Averago daily increase per group	0.617	2.787	4.681
Average individual increase	9.667	43.667	73.333
Average individual daily increase	0.206	.929	1.560

TABLE LXIV gives the values during the after experiment.

——	Group 1.	Group 2.	Group 3.
	$ c.	$ c.	$ c.
Value at commencement	32 76	25 15	21 72
Cost of food	4 33	8 66	8 66
Total cost of animals and food	37 09	33 81	30 38
Value at close	34 06	33 16	34 33
Gain or loss	—3 03	—0 65	3 95
Gain or loss per cent. on investment	—8 17	—1 92	13 00

At the close of the after experiment all the animals in the different groups were sold for slaughter at $4.50 per hundred live weight. The condition of the animals in groups 2 and 3 when sold was prime, in fact very similar to the condition of the pigs in group 1, at the close of the experiment proper. The weights on each occasion were taken after a fast of fifteen hours.

TABLE LXV. gives the financial results of the whole test which lasted 137 days.

——	Group 1.	Group 2.	Group 3.
	$ c.	$ c.	$ c.
Value of animals on December 4th, 1890	17 44	16 59	17 70
Cost of food during experiment	12 24	11 15	8 08
Cost of food in after experiment	4 33	8 66	8 66
Total cost of animals and food	34 01	36 40	34 44
Prices realised when sold, April 20th, 1891	34 06	33 16	34 33
Gain or loss	0 05	—3 24	—0 11

It will be observed that at the close of the experiment proper on March 4th, 1891, the gain or loss on the experiment was as follows: With group 1 the gain was $3.08, with group 2 the loss was $2.59 and with group 3 the loss was $4.06.

It should be borne in mind that there was a profit on the food fed, as it was charged at market values instead of the cost of production. What this profit would be it would be scarcely possible to estimate correctly.

CONCLUSIONS. The following are the more important of the conclusions from the experiment:

1. That in fattening store pigs of the age indicated for 90 days on a meal ration, such as that used in the experiment, the handsome profit of 10.38 per cent. was realised on the investment, the food being charged at market values. When the food is raised on the farm there would be an additional profit in most instances.

2. That it has not been found profitable to feed store pigs of the age indicated for a lengthened period on a ration, one-half of which is composed of meal similar to that given to the pigs in group 1, the balance being made up of turnips, as in this experiment the loss from feeding such a ration for 90 days was 9.34 per cent. on the investment.

3. That it has not been found profitable to feed store pigs of the ages indicated for a lengthened period on a ration, one-half of which is composed of meal similar to that given to the pigs in group 1, the balance being made up of corn ensilage, as in this experiment the loss from feeding such a ration for 90 days was 15.75 per cent. on the investment.

4. That in fattening pigs of the age indicated for 90 days, it required the daily consumption of 4.53 lb. of meal to produce an average gain of .974 lb. per day.

5. That after pigs have reached that stage in the fattening process when they cease to make a relatively good increase in weight for the food fed, they are then kept at a loss. The extent of this loss in the present instance was very material. With the pigs in group 1 it was no less than 8.17 per cent. on the investment in 47 days. Every 100 lb. of additional weight of pork was made at a cost of $14.93, while in the experiment proper, with the same animals it cost only $4.65.

6. That in feeding pigs of the ages indicated for a period of 90 days on a ration, one-half of which was meal and the balance turnips in the one case, and corn ensilage in the other, and then subjecting them to a fattening process on a meal ration for 47 days, the influence of the corn ensilage on development during the said period was much more marked than that of the turnips, as in the former instance the average daily gain during the fattening period was 1.560 lb. and in the latter but .929 lb. although the amount of food consumed in each instance was the same.

7. That in this experiment it was found that there was no material profit from the pigs of the groups which were fed for the longer term, which would seem to indicate that pigs should be finished for market at an early age to get the best results.

(40). FEEDING SWINE WITH GRAIN AND MEAL.

Economical feeding is always important, but when margins are close as they have been during recent years it is doubly so. The profit or loss in feeding animals may hinge upon the mode of preparing the food and on some very slight change in preparing it. To show the greater necessity of giving careful attention to what many look upon as minor details is one of the objects of the bulletin given below.

This experiment began on May 7th, 1891, and closed August 6th, thus covering a period of 91 days. Its primary object was to ascertain the extent of the advantage arising from feeding swine on a suitable ration of various kinds of meal mixed, as compared (1) with a ration of peas and barley ground, and (2) a ration of the same grain unground. It is the second experiment undertaken with the same object in view. The results of the former were given in Bulletin LV, issued in December, 1890.

THE ANIMALS SELECTED. The animals chosen for the experiment, nine in number, were all Yorkshire grades. They were purchased by Mr. J. E. Story, the Farm Foreman. They were got from a pure Yorkshire boar, and high grade Berkshire sows of mixed breeding. Six of them were of one litter and three of another. The former were farrowed on Dec. 20th, 1890, and the latter a few days later. They were brought to the Farm on April 21st, 1891. The average live weight was 104 lb., and the price paid for them was $4.75 each, or 4.57 cts. per pound. For seven days they were all fed similarly, at the end of which time the period of preparation commenced.

PERIOD OF PREPARATION. The animals were divided into three groups with three in a group. Each group had two animals of one litter, and one of the other. Group 1 comprised three barrows, and group 2 and 3 respectively had two barrows and one sow in each. The animals of each group were confined in a separate pen 6x10 feet (all the room available), and were not allowed any run. For seven days they were fed upon the same rations as that given to them during the experiment.

FOOD AND FEEDING. The experiment proper commenced on May 7th. The food fed to the animals throughout the experiment consisted of the following respective rations:

Those in group 1 were given peas, barley and oats, ground, and wheat middlings in proportions of 2, 1, 1, and 1 part respectively. Those in group 2 were given equal parts of peas, and barley ground. Those in group 3 were given equal parts of peas and barley unground. They were fed three times a day, and were given in quantity all they would eat up clean. The meal or grain ration, as the case might be, was first put into the trough and water was then added.

TABLE LXVI gives the daily amount of the food consumed by each group, and also the total amount consumed.

—	Group 1.	Group 2.	Group 3.
	lb.	lb.	lb.
Food eaten daily	18.19	17.46	17.46
Food eaten throughout the experiment, 91 days	1655	1589	1589

For several days after the commencement of the experiment each group was fed 12 lb. of food per day. This amount was increased from time to time as it was found that the animals required it. During the last 20 days of the experiment it was found that the pigs in group 1 would consume 24 lb. daily, or 8 lb. per animal, while those in groups 2 and 3 consumed but 21 lb. daily, or 7 lb. per animal.

WEIGHTS. At the commencement of the experiment proper the pigs were fasted from 6 p.m., after having received their evening meal, until 9 o'clock the following morning. They were fasted similiarly to obtain the shrunken weights at the close of the experiment. The natural weights were also taken in both instances during the middle of the afternoon previous to the fast. The average amount of shrinkage in the first instance was found to be $3\frac{2}{3}$ lb., and in the second instance $5\frac{7}{8}$ lb. The shrunken weights were taken in both instances as the basis for computing values.

TABLE LXVII gives a summary and an analysis of weights.

—	Group 1.	Group 2.	Group 3.
	lb.	lb.	lb.
Weight at commencement	352.00	322.00	328 00
Weight at close	772.00	712.00	661.00
Increase per group	420.00	390.00	333 00
Average daily increase per group	4.62	4.29	3.66
Average individual increase	140.00	130.00	111.00
Average individual daily increase	1.54	1.43	1.22

It will be observed that the pigs which received the mixed meal ration made the highest gains, that those which were fed the ground ration of peas and barley stand next in order, and those which were fed the same ration unground came lowest.

The comparison between the results obtained from feeding the ration of ground peas and barley, and the same ration unground to the pigs in groups 2 and 3, is most interesting and instructive. The conditions were very similar. Each group had two barrows and one sow. The same quantity by weight, and the same kinds of grain were used in both instances. The aggregate weight of the pigs in group 2 at the commencement of the experiment was 6 lb. less that that of those in group 3, while at its close the weight of this lot was 51 lb. more, that is to say, the pigs in group 2 gained 57 lb. more than those in group 3 on precisely the same ration, except that the grain in the former instance was ground.

The cost of grinding the grain was $1.05 on the basis of the estimate made, as will be seen by what is stated below. In this experiment, therefore, the advantage is unquestionably in favor of feeding the grain ground. The average daily gains during the experiment were exceptionally good. In no instance were they much less than 1¼ lb. per day, and with the pigs in the first group they were more than 1½ lb. per day throughout the experiment.

ESTIMATED VALUE OF THE FOOD. The food was estimated at the current market values in Guelph less the cost of marketing from an Ontario farm under average conditions. The home value put upon the peas was 53 cents per bushel, oats 34½ cents, barley, 43 cents, wheat middlings, $18.80, delivered. Six cents per 100 lb. were allowed for grinding. The cost of the feeding ration when ready for use was therefore 94.17 cents per 100 lb. for the animals in group 1., 94.96 cents for those in group 2, and 88.96 cents for those in group 3.

TABLE LXVIII gives the financial results of the experiment.

—	Group 1.	Group 2.	Group 3.
	$	$	$
Value of animals at commencement of test	16.09	14.72	14.99
Cost of Food	16.08	15.09	14.14
Total cost	32.17	29 81	29.13
Value of animals at close of test	42.46	39.16	36.36
Gain	10.29	9.35	7.23
Gain per cent. on investment	32.0	31.4	25.0

The price put upon the pigs at the commencement of the experiment was the same rate per pound as the price paid for them when purchased. The interval covered only a few days. At the close of the experiment the actual cash price received for the pigs forms the basis of computation, as they were then sold to a Guelph buyer. The former price was 4.57 cents per lb. live weight as already stated, and the latter 5.50 cents per lb. No account is taken in this experiment of attendance, bedding, interest on capital and manure, as these were not estimated in a former experiment of a similar character. The value of the manure however, will, in all such instances more than offset the other items of outlay. It will also be observed that in all probability a profit has already been made on the marketable food used, providing it has been grown upon the farm, as in this experiment the food was charged at the full market values less the cost of marketing from an average Ontario farm. This profit will be represented by the difference in the cost of growing and marketing, and the market value put upon the food.

It will be observed that the net profit of the experiment was $26.87. Now suppose the pigs had been fed at another season of the year, so that they would have been marketed during the months of November and December, when pork only brought 4 cents per lb live weight, as was the case last autumn. With all the other conditions the same, the loss would have been $5.31, not taking into account attendance, bedding, interest on capital and manure, that is to say, the difference in the net return would have been $32.18.

Conclusions.

1. That in this experiment the cost of 100 lb. of increase in live weight from the mixed meal ration given to the pigs in group 1 was $3.83 ; from the ground grain ration given to the pigs in group 2, $3.87 ; and from the unground grain ration given to the pigs in group 3, $4.25.

2. That when everything is favorable as in this experiment, and the conditions similar, it is possible to secure an average increase daily in live weight of 1.4 lb., worth 7½ cents, and at an outlay for food of 5½ cents, to say nothing of the increased value per pound of the original live weight of the animal.

3. That when pigs are fed on a mixed ration similar to those in group 1, they will consume more food than when feed on a less varied ration, such as was given to those in groups 2 and 3, but the corresponding gains will also be greater.

4.. That this experiment demonstrates the advantage of feeding ground peas and barley over feeding the same unground to pigs of similar ages with those in this experiment.

5. That the weight of pigs 15 hours after an ordinary meal as compared with those taken 3 hours after an ordinary meal, were in this experiment 3⅔ lb. less per animal at its commencement, and 5⅞ lb. less per animal at its close.

6. That in this experiment the value of the animals was increased by the fattening process an average of .93 of a cent per pound.

(41) Feeding Grade Steers of Different Breeds.

The question of raising beef is one of great importance to the Canadian farmer Any item of information that will add to the profits of a trade which is bringing more than $5,000,000 annually into the country, should be hailed with satisfaction by those engaged in the business. The experiment, the particulars of which are given below, was undertaken in the hope of furnishing such information.

This experiment consists in the rearing of grade animals of different breeds, from birth to early maturity. The animals were chosen from breeds, whose fitness for beef production, has been recognized, to some extent, by at least some sections of the community. The experiment commenced in the autumn of 1889, and will be completed, in its main features, when the animals have reached the age of two years. The portion of it covered by this bulletin brings them only to the completion of their first year.

The primary objects of the experiment were to ascertain : (1) The average cost of rearing grade steers, for purposes of beef production, from birth, until the period of early maturity, when fed upon a heavy or forcing ration. (2) The comparative cost of rearing grade steers on whole and skim milk, respectively, and the effects of these on development, after the termination of the milk period of feeding. (3) The comparative cost of producing beef from well graded and native or scrub animals respectively.

The chief of the secondary objects were to ascertain: (1) The relative cost of rearing animals for beef production, during different periods of growth, when fed upon a heavy ration. (2) The relative daily gains. (3) The total relative increase in weight.

In the effort to secure these objects, it was thought, that if grade animals were secured of the different breeds, which to a greater or less extent have been used for making beef, that the results would be even more valuable than if they were of the same grade. They were secured therefore on this basis:

THE ANIMALS SELECTED. The animals secured, 8 in number, were obtained from leading breeders, and wherever they could be got of a suitable character. Each individual was the offspring of a pure registered sire, except in the case of the native, or scrub, and the aim was, in every instance, except in that of the native to have the dam a common grade cow. The effort to secure them as near the birth period as possible, was also fairly successful, except in the case of the Galloway grade, which was fifty-three days old, when it reached the farm. The Shorthorn grade, to which was fed whole milk, was 14 days old, and the others were all less than 9 days old. The more important particulars regarding these animals, are given in the subjoined table. The colour, generally speaking, was typical of the breed of the sire.

TABLE LXIX gives particulars regarding the breeding and the leading characteristics of the different animals.

Grade.	Date when calved.	Sire.	Dam.	Characteristics of steers.
Galloway	Nov. 2nd, 1889	Rajah of Brooke (3970)	$\frac{1}{8}$ Shorthorn and $\frac{7}{8}$ Canadian	Short legs and blocky frame
Shorthorn....	Dec. 22nd, 1889	Methlick Hero, =2723= imp.	A Shorthorn grade	Rather leggy for Shorthorn type
Aberdeen poll.....	Jan 1st, 1890	Runnymede 2nd, 5220	A common two-year-old heifer	Not robustly developed
Hereford..........	Jan. 5th, 1890	King Hal	A good common cow	Short legs and heavy body
Devon.....	Jan. 8th, 1890	Duke (947)	A Shorthorn grade	Neatly and squarely-built frame
Holstein...........	Feb. 17th, 1890	African Prince (H.F.H.B), 1270	A common cow	Large sized and rather coarse in bone
Shorthorn fed on skimmed milk...	April 1st, 1890	Macduff	A Shorthorn grade	Medium size and neatly built frame
Native or scrub....	April 16th, 1890	A native bull of the rangey type	A three-year-old native	Narrow bodied, flat ribbed and long legged

FOOD AND FEEDING. Milk was fed to each of the animals, until six months old. Of this they were given a fair allowance, but not all they would take. They were all given whole milk, as stated in table No. LXX, except one of the Shorthorn grades, which was given milk. They were fed by hand, morning and evening. The skim milk was warmed by heating, before being fed. The adjuncts fed in addition to the milk, were clovery hay cut, green fodder in the season, and meal consisting of equal proportions, by weight, of peas, oats, wheat screenings, and bran. None of the meal was given along with the milk. During the second six months, they were fed hay, green food, roots and meal. The hay was similar in kind to that mentioned above. The green fodder consisted of oats and pease, clover and millet, as these crops come in season. The roots comprised, turnips and mangels. They were not fed at the same time, and were sliced before being fed. The meal during the first three months of this period, consisted of peas, oats, and wheat screenings, ground; bran and oil cake, in the proportions of 4, 4, 4, 4, and 3 parts respectively. During the next three months, they received a meal ration of peas and oats, ground, and bran, in the proportions of 2, 2, and 1 respectively. The meal throughout was fed dry, along with the hay which was cut. The aim was to give each animal about the same quantity of meal, but some would not take so much as others, which accounts for the difference in the amount eaten, as given in the subjoined table. The food was given in three meals per day, and they virtually had access to water at will The animals were kept in box stalls, until they were about six months old. After that time they were tied in stalls, and were allowed to exercise about one hour daily, in the barn yard. The first six months will be referred to hereafter in this bulletin, for the sake of convenience, as the first, or milk period, and the next six months as the second period.

FOOD EATEN. It will be observed, in the subjoined table, that the consumption of food was large, more especially with the more concentrated, and costly rations, as milk and meal, but this was in keeping with the objects of the experiment, as already expressed. The kinds of meal fed, were doubtless too concentrated and costly, and the quantities given, too large to give the best results financially.

TABLE LXX gives the consumption of food during the first and second period respectively.

Grades.	Kind of milk given.	First six months.				Second six months.			
		Milk.	Hay.	Meal.	Green fodder.	Hay.	Meal.	Green fodder.	Roots.
		lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.
Galloway	Whole	2091.5	215.5	281.5	20.0	721	1489	826	511
Shorthorn	Whole	4383.6	107.0	196.5	68.0	855	1779	615	1575
Aberdeen poll	Whole	4182.2	113.0	195.5	57.0	717	1500	857	906
Hereford	Whole	4154.0	140.0	243.5	66.0	788	1754	561	1500
Devon	Whole	3611.4	112.0	134.5	70.5	912	1682	548	1541
Holstein	Whole	4475.5	110.0	190.5	125.5	884	1744	219	2377
Average	....	3816.4	132.9	207.0	67.8	812.8	1658	604.3	1401.7
Shorthorn	Skim'd	4691.5	175.5	188.0	212.0	1059	1652	....	3261
Scrub or native	Whole	3761.7	71.5	92.5	148.0	757	1246	....	2898

It has been already mentioned that the Galloway grade did not reach the farm until 53 days old. Prior to that time, he was suckled by the dam. The estimate for the consumption of whole milk, by this animal during that period, was the average of the consumption of all the other animals, which were given this ration. It will be noticed that the total consumption of milk by this calf was small relatively. This was owing to the fact that he would not drink it regularly, but made up for the deficiency apparently, in the free consumption of hay and meal. The Shorthorn grade, to which skim milk was fed, took more of this in quantity, than the average grade consumed, of whole milk, and also more of hay and roots, but a little less of meal. The native, or scrub, consumed considerably less than the average, of all the food factors, except roots.

ESTIMATED VALUE OF THE FOOD. The fodder, the grain, and the roots were estimated at the current market values, in Guelph, less the cost of marketing, from an Ontario farm, under average conditions The home value put upon the hay, therefore, when cut, was $5.00 per ton ; the green fodder $2.00 per ton ; the oats 24½ cents. per bushel ; the peas 47 cents ; the wheat screenings 30 cents. ; and the roots when sliced, as 8 cents. The grinding of the grain was put at 6 cents. per 100 pounds. The bran and oil cake reckoned, as delivered at the average Ontario farm were put at $12.90 and $26.66⅔ per ton, respectively. The whole value, put upon the whole milk, was 60 cents. per 100 lb. This conclusion was reached, by valuing the milk delivered at an average Ontario factory, at 70 cents. per 100 lb, and allowing 10 cents. per 100 lb for delivering the same. The price allowed, for drawing the milk, may be considered a shade high, for some localities. The home value put upon the skim milk, the buttermilk reckoned at the same rate was 15 cents. per 100 lb. This conclusion was reached by deducting the value of the butter, less the cost of making, from the home value of the whole milk. It was estimated that the average yield of butter, from 100 lb of whole milk, in the farm dairy is 3¾ lb, that the cost of making is

3.9 cents per. lb, and the average price obtained for it is 16 cents. per lb. It will be observed that in all probability a profit has already been made on the marketable food used, providing it has been grown upon the farm, as in this experiment the food was charged at the full market values, less the cost of marketing, from an average Ontario farm. This profit will be represented by the difference between the cost of growing the food, and the market value put upon it.

TABLE LXXI gives a summary and an analysis of weights.

Grades.	Individual weights at end of—		Individual daily increase during—		
	First six months.	Second six months.	First six months.	Second six months.	First twelve months.
	lb.	lb.	lb.	lb.	lb.
Galloway	457	800	2.51	1.86	2.19
Shorthorn	530	890	2.91	1.96	2.44
Aberdeen poll	485	754	2.66	1.46	2.07
Hereford	545	900	2.99	1.93	2.47
Devon	434	803	2.88	2.01	2.20
Holstein	537	883	2.95	1.86	2.42
Average (grades of six breeds)	498	838.3	2.73	1.85	2.30
Shorthorn (fed on skimmed milk)	454	848	2.49	2.16	2.32
Scrub or native	386	700	2.12	1.76	1.92

NOTE.—In all the figures given above, the weight at birth is included. It was impossible to ascertain the birth weight owing to the way in which the calves were obtained.

It will be observed that at the close of the first period, the animal to which skim milk was fed, was but 44 lb less than the average grade, in weight, while he weighed 68 lb more, than the native or scrub. At the end of one year, he weighed 9.7 lb more than the average grade, and 148 lb more than the scrub or native. The latter weighed 112 lb less than the average grade at the end of the first period, and 138.3 lb less, at the end of the second period. It will also be observed, that the lightest animal at the end of both periods is the native or scrub.

TABLE LXXII gives the financial results at the close of milk period.

Grades.	Cost of			Total cost.	Value of		Total value.	Gain or loss
	Animal at birth.	Food.	Attendance.		animal when six months old.	Manure		
	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.
Galloway	2 00	11 79	2 60	16 39	25 14	1 27	26 42	+10 02
Shorthorn	2 00	28 11	2 60	32 71	29 15	1 27	30 41	-2 29
Aberdeen Poll	2 00	26 89	2 60	31 49	26 68	1 27	27 95	-3 54
Hereford	2 00	27 93	2 60	32 53	29 98	1 27	31 25	-1 28
Devon	2 00	23 01	2 60	27 61	23 87	1 27	25 14	-2 47
Holstein	2 00	28 66	2 60	33 26	25 51	1 27	26 78	-6 48
Average (grades of six breeds)	2 00	24 40	2 60	29 00	26 72	1 27	27 99	-1 01
Shorthorn (fed on skimmed milk)	2 00	9 06	2 60	13 66	21 57	1 27	22 84	+9 18
Scrub or native	1 00	23 58	2 60	27 18	14 48	1 27	15 75	-11 43

The value put upon the animals at birth was of necessity an estimate, that would be about the real value when they were dropped. The cost of attendance was reckoned on the basis that one man would feed and care for 75 calves per day, under ordinary conditions, when the food has been made all ready. The following was the valuation put upon the different animals in the experiment, viz., Galloway grade, 5½ cts. per pound live weight; Shorthorn grade, 5½ cts.; Aberdeen poll grade, 5¼ cts.; Hereford grade, 5½ cts.; Holstein grade, 4¾ cts.; Shorthorn grade (fed on skim milk), 4¾ cts., and native or scrub, 3¾ cts. This valuation was made at our request by Mr. James Millar and Mr. A. White, live-stock dealers, Guelph.

Notwithstanding that each of these gentlemen estimated separately, the respective valuations made by them were in substantial agreement, The estimated amount of manure made per animal during the first period was 38.91½ lb. This was reckoned as worth $1.00 per ton. From the sum thus obtained, the deduction was made of 903½ lb. of straw allowed for bedding, the home value of which was put at $1.50 per ton. This estimate was based upon actual results, obtained from a test conducted simultaneously with another calf, and mainly with the object of ascertaining the amount of manure produced by a cattle beast during different stages of its growth. The following facts stand out prominently at the close of this period, viz.:

(1) The much greater cost of a whole milk ration with adjuncts, as compared with a skim milk ration, with the same. With the first the average cost of the food was $24.40 per animal, and with the last $9.06 or nearly two-thirds less.

(2) That although in the comparison just drawn there is a difference of $15.34 in the cost of the food, the difference in the value of the animals at the close of the period is only $5.15.

(3) The small amount of milk consumed by the Galloway grade, after the first 53 days reduced the cost of the ration fed to him to $11.79 or $12.61 less than the average, and yet the difference between the average gains per day was not very marked. This would seem to indicate that a liberal whole milk ration is not an absolute necessity after the first 2 months of the life of the animal, and that the nature of the ration given affects the cost of production more than the particular improved breed with which the animal is connected.

(4) The difference in the total value of the animal fed on skim milk, as compared with the average of those fed on whole milk, cost considered, is $10.19 in favor of the former, and as compared with the native or scrub $20.61.

TABLE LXXIII gives the financial results at the end of one year.

Grades.	Cost of			Total cost.	Value of		Total value.	Gain or loss.
	Animal at birth.	Food.	Attendance.		Animal.	Manure		
	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.
Galloway	2 00	27 22	5 63	34 85	44 00	6 00	50 00	+15 15
Shorthorn	2 00	47 53	5 63	55 16	48 95	6 00	54 95	-21
Aberdeen Poll	2 00	43 02	5 63	50 65	39 59	6 00	45 59	-5 06
Hereford	2 00	46 47	5 63	54 10	49 50	6 00	55 50	+1 40
Devon	2 00	41 62	5 63	49 25	44 17	6 00	50 17	+92
Holstein	2 00	48 53	5 63	56 16	41 94	6 00	47 94	-8 22
Average (grades of six breeds)	2 00	42 40	5 63	50 03	44 69	6 00	50 69	+66
Shorthorn (fed on skimmed milk)	2 00	29 59	5 63	37 22	40 28	6 00	46 28	+9 06
Scrub or native	1 00	39 61	5 63	46 24	27 13	6 00	33 13	-13 11

During this period the allowance for attendance is the same as in the previous one, with the difference that one person is supposed to care for 60 animals instead of 75 as in the former period. The animals were valued at the same rate per pound live weight as at the close of the milk period. The amount of the manure made per animal was put at

9996 lb., and it was reckoned at $1.25 per ton. From the sum thus obtained, there was deducted 2021¾ lb. straw, valued as in the former instance. This estimate was also based upon actual results obtained as in the first reckoning of the manure. It will be observed that the animal fed on skim milk cost $12.81 less than the average grade fed on whole milk, and $9.02 less than the native or scrub, whereas he gave a net gain of $9.72 in advance of the former, and of $22.17 in advance of the latter. While the native or scrub cost $3.79 less than the average grade, the net return given by him was also $17.56 less, that is to say he cost $13.77 more than the former when one year old. He not only made the lowest gain per day, but was also rated the lowest by the valuators.

Conclusions. - The following are a few of the conclusions that may be drawn from the experiment:

(1) That we should be slow to draw conclusions as to the relative value of the different improved breeds for making beef, as the food and individuality of the animal exert so marked an influence.

(2) That the behaviour of the Galloway grade gives countenance to the idea that when a calf has been fed liberally by the dam for about two months, a milk ration is not indispensible after that period.

(3) That the average grade of the different breeds in this experiment, when well fed, will make a daily gain of 2.3 lb. during the first year when the wight at birth is included.

(4) That animals without improved blood, are not capable of making gains so rapidly as those of good breeding, although fed with the same liberality.

(5) That a young cattle beast fed on a skim milk ration with adjuncts, may be made to weigh almost as much, when one year old, as one of similar breeding fed on a whole milk ration, with adjuncts of a similar kind.

(6) That the cost of making beef from young animals, to which a whole milk ration has been fed, is much greater relatively, than from those to which a skim milk ration has been given.

(7) That while making beef from grade calves up to the age of one year, is highly profitable, when they are fed upon a skim milk ration, followed by a heavy meal ration. that but little profit can be obtained when they are fed upon a whole milk ration, followed by the same.

(8) That some animals are more capable of producing beef of a higher quality than others.

(9) That it is decidedly unprofitable to attempt to grow beef from native or scrub stock, even when the conditions are all favorable.

This bulletin requires to be supplemented with some further explanations. It is stated therein, that a heavy meal ration was purposely fed during the second period, and that because of this the financial results were probably not equal to what they would have been under other conditions. It is moreover also probable that development during the second year of feeding will be hindered. With a view of getting more light on this very important matter, it may be mentioned here, that it is the intention to feed a lighter ration to the next lot of steers, to be experimented with during the early stages of their growth. Some of the animals in the experiment consumed a much larger amount of food than others, and this applies to both milk and meal, although, practically they were given about all they would consume cleanly, of both. Because of this, the inference would seem fair, that when the components of a food ration are given separately to young animals, the wisdom of feeding the same quantities, relatively, of each of these, is at least questionable, owing to preference in tastes manifested. The careful feeder therefore cannot afford to ignore this fact when he is pushing animals with a definite object in view. It will be observed, that the trend of this experiment heads in the direction of determining the relation between the feeding and the commercial value of foods. Nowhere is this so apparent as in the results obtained from feeding a whole milk ration, and a skim milk ration, respectively. The light thrown upon this hazy question is valuable, and if these experiments are repeated for a number of times, we will probably be able to get a near approximation to the truth. In summing up results of feeding experiments with live stock, some of the items at least will, of necessity, be estimated. The whole results are not seriously affected, however, because of this, providing we are certain that the estimates are very nearly correct. We have an instance in this experiment, in the estimate, as to the quantity of the manure made by each of the animals. It is manifest that each of these did not make the same quantity of manure, exactly, nor would this be quite the same in quality. There would be a difference in both of these respects, owing to a difference in the quantities and kinds of food consumed by each respectively. This difference, however, would not be so great as seriously to affect the whole results. During the second period the manure was valued at 25 cents per ton more than during the first one, as the ration in the former instance was decidedly richer in fertilizing elements, and a less amount relatively would be used to build up the frame. The financial results cannot be said to be encouraging in this experiment. This is in accord with our expectations when the test commenced. They go to show that in making whole milk into beef, there is a loss when it is freely fed, even when the manure is taken into account. They also demonstrate that this loss is so much that the second six months of feeding will not more than make up for it. It is probable, however, that when good grade calves of certain breeds are selected and fed judiciously on a skim milk ration, there will be a gain, the manure excluded, of about $10.00 at the end of the first year, and the value of the manure will be about $7.27. When the food is grown at home, there should also be a profit on the food.

It may be well, before leaving this experiment, to call attention to the enormous amount of labor involved in such an undertaking. In preparing the food for these animals, the first year there were no less than over 2,500 separate weighings. Then there was the frequent weighing of the animals themselves, and care and attendance in various ways. After the material has thus been obtained, the labor of summarising it, and presenting it in regular and condensed form is very great. The individual who properly weighs these statements will be slow to pass ill-considered and uncharitable judgments in regard to work of this character.

(42) A Feeding Test between the Improved Yorkshire and Berkshire breeds of Swine.

This test is between three animals of each of the above breeds. It is not yet completed, and we therefore refrain from giving particulars.

(43) An Experiment to determine the Amount of Manure made by a Cattle beast during the Successive periods of its growth.

This experiment is one of rare interest, and will, when completed, prove of much value in the computation of manurial products of the barn yard. It is the first of the kind, so far as we know, that has ever been conducted with a cattle beast from birth.

(44) An Experiment to determine the effects of constant Confinement upon Breeding properties of a Cattle beast.

This experiment has been under way for nearly two years. It will probably be concluded before the end of 1892 when the results will be published.

(45) The Feeding of Lambs upon Rape alone, Rape and Meal, and Rape and Pasture.

On Sept. 30th 45 lambs were turned in upon three acres of rape. The rape was of average growth. It followed a crop of rye cut in the month of June and cured for winter fodder. The three acres were divided into three equal parts by hurdle fences. Each of the plots formed very nearly a square. The lambs were weighed on September 29th. The following day they were divided into 3 groups and put upon the rape as stated above. Those in group 1 were confined to the plot, and were not given anything additional except salt. Those in group 2 were given on an average a little more than one-half pound of oats daily per animal and salt. The whole amount of grain consumed was 345 pounds, or 23 pounds per animal. Those in group 3 were given salt in addition to the rape, and also had the run of an adjoining pasture. The lambs were removed November 27th. They had fed, therefore, upon the rape for 58 days, or nearly two months. The rape was eaten off clean on plots 1 and 3. On plot 2 a small quantity was left uneaten. The lambs were again weighed on November 28th. Fasted weights were used in both instances.

TABLE LXXIV gives individual live weights.

Group 1.			Group 2.			Group 3.		
At commencement.	At close.	Increase.	At commencement.	At close.	Increase.	At commencement.	At close.	Increase.
lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.
84	111	27	68	100	32	89	123	34
98	124	26	67	98	31	82	116	34
70	96	26	55	85	30	71	105	34
68	94	26	73	102	29	62	94	32
62	87	25	70	99	29	57	88	31
72	97	25	80	109	29	66	96	30
79	102	23	73	100	27	71	99	28
64	87	23	56	81	25	81	109	28
62	84	22	84	104	20	72	99	27
67	88	21	70	90	20	73	100	27
70	89	19	85	104	19	67	93	26
75	94	19	77	95	18	72	97	25
70	89	19	78	94	16	73	98	25
55	74	19	61	77	16	60	81	21
73	87	14	68	83	15	68	86	18

TABLE LXXV gives a summary and an analysis of weights.

	Rape. Group 1.	Rape and meal. Group 2.	Rape and grass. Group 3.
	lb.	lb.	lb.
Weight at commencement	1069	1065	1064
Weight at close	1413	1413	1484
Average individual increase	22·93	23·67	28 00
Average individual daily increase	·39	·40	·47

The individual gain of the lambs in group 1 per month was 11.7 lb. of those in group 2, 12 lb. and of those in group 3 14·1 lb. It would, therefore, appear, that the increase is considerably greater when the lambs have access to a pasture run than when confined to the rape.

(46) THE FEEDING OF LAMBS UPON RAPE ALONE WHEN ALL THE CONDITIONS ARE FAVORABLE

TABLE LXXVI gives the individual weights.

Ear number.	Weight at commencement.	Weight at close.	Increase in live weight.
	lb.	lb.	lb.
1049	71	88	17
1114	82	115	33
1159	71	88	17
1182	66	86	20
1192	55	71	16
1193	67	84	17
Total	412	532	120

In field No. 18, .1575 acres, or about one-sixth of an acre of rape was sown upon land where the experimental carrot crop had failed to germinate properly This plot was enclosed with hurdles and 6 lambs placed upon it September 30th. They remained until November 11th, a period of 42 days, by which time the rape was all eaten. They were not allowed to leave the plot during the whole time of the experiment, but were provided with shade, and were given all the salt they would take, but nothing more in addition.

The total gain of the 6 lambs was 120 pounds. The gain of each lamb per day was .345 lb. and 10.35 lb. per month. At the above rate of consumption one acre of rape would have pastured 36.8 lambs for two months, and it would have made 732 pounds of mutton.

(47) Feeding Lambs upon Rape grown after Winter Wheat.

Winter wheat was grown upon 73 plots in field No. 18. The whole area was 2.18 acres. The 26 Canadian and American varieties yielded an average of 53 bushels per acre, and had an average weight of 63.3 lb. per measured bushel. The ground on which the wheat grew was plowed after its removal, rolled, harrowed and drilled and sown with rape Aug. 12th. The paths between the plots, although included in the acreage, are to be considered, as they had produced no grain crop the same season. On October 17th, 60 lambs, brought from P. E. Island, were put upon the rape. They were hurdled upon it for 25 days. They received nothing in addition during this time except salt.

Table lxxvii gives the results.

	lb.
Weight at commencement	3423
Weight at close	3813
Total increase	390
Average individual increase	6.5
Average individual daily increase	.26

The Exhibit of Live Stock.

An exhibit of Live Stock was made this year at the Toronto Industrial Exposition. It comprised grade steers of the following breeds, viz: Galloway, Shorthorn, Aberdeen Angus Poll, Hereford, Devon, Holstein, Shorthorn (fed on skim milk), and scrub or native. This exhibit evoked much interest. The contrast between the scrub or native, and the better bred animals was so striking that it could not fail to have conveyed a valuable lesson as to the care that should be exercised in the choice of animals for feeding, and also in reference to the breeding of the same.

III. CO-OPERATIVE EXPERIMENTS.

(48-59)—Ninety plots were grown at this station during 1891 in conjunction with the 2,642 plots grown by ex-students and other farmers throughout Ontario. The results of the work will be found in the Experimental Union Report at the end of this volume

REPORT OF FARM FOREMAN.

To Prof. Thomas Shaw :

Sir,—I have the honor of presenting to you my fifth annual report of farm operations and student labor for the closing year. On the whole, this has been a very successful year ; the crop of hay and straw is lighter than that of former years, owing to excessive drouth of the months of May and June, but the grain is of good quality and an average yield. The student labor has, as heretofore, been equally divided between the eight different departments as follows : Farm, live stock, horticultural, experimental, mechanical, dairy, library, and the Bursar's office. The distribution is so arranged that each student has a constant rotation of the different departments, where he receives instruction, and is rated by the overseer of each department by the hour for whatever his work may be worth.

Besides the regular farm work, the students have done a great deal of work which we might class as permanent improvements. For instance, during the months of February and March, they sifted 408 loads of gravel from a pit lying in field No. 3, which is naturally of a very rough quality. The coarse stones, which amounted in bulk to more than the fine gravel, were hauled to a low place where, in former years, gravel had been hauled from and used to level up roads. The gravel was hauled by the farm teams to the farm lane running through the north-east half of the farm, where the students were instructed how to make a proper road-bed. They also cleared a part of the swamp land lying on the east side of the farm, cutting what timber would make firewood into lengths suitable for use in our farm engine.

During the month of February we also stored up the supply of ice, for use during the summer season at the creamery and college ice houses. The cutting is let by contract, the hauling is done by the farm teams, and the loading and packing is done by student labor.

During the winter months we hauled the manure from the farm yard to fields No. 7 and 11 and piled it in wide, flat piles, so as to ferment it without over heating. In this way we save labor, as we can cart it over the fields and spread it with student labor in spring time while the farm teams are engaged with the seeding.

The students also did the greater part of the the threshing after the opening of the college in February and March.

During the summer months, when the students are at their homes, we are obliged to employ day hands from the city for hoeing root crops, cutting fence corners, making hay, harvesting, threshing, filling silos, etc., etc. After the re-opening of the College on October 1st, we have sufficient student labor to take up the roots and spread the manure which accumulates during the autumn ; the balance of this labor is used in road-making, fencing, and other improvements on the farm.

Cropping.

The increasing number of experimental plots in the farm department for the purpose of procuring larger quantities of pure seed from varieties which prove to be useful to our farmers, involves a great deal of extra labor to our department, and we would suggest for another year that the Experimental Department assist us in seeding, harvesting and threshing these large plots.

Field No. 1.—This field grew 26 plots of grain, also about one acre of corn for use in dairy stables. On the north-west side of the field were 24 plots of ½ acre each. A space of five links in width was left between them, which was kept clean by horsehoeing occasionally through the months of June and July.

The following is a report of the different yields :

Crop.	Date of seeding.	Yield per acre.	Date of maturity.
Barleys.		Bush.	
Improved Cheyne	April 29.	36.00	August 14.
Mandscheuri	"	65.56	" 13.
Chevalier	"	51.69	" 13.
Oderbrucker	"	51.69	July 30.
Hallett's Pedigree	"	50.81	August 18.
Cape	"	41.44	" 13.
Oats.			
White Bonanza	April 29.	55.15	August 8.
Siberian	"	98.21	" 9.
Probsteir	"	101.47	" 21.
White Poland	"	76.50	" 9.
White Tartarian	"	87.79	" 25.
Joanette	"	75.91	" 16.
Spring Wheats.			
Rio Grande	April 30.	19.55	August 12.
Holben's Improved	"	24.45	" 12.
Manitoulin	"	24.85	" 9.
Red Fern	"	25.45	" 8.
Herison Bearded	"	15.5	" 10.
Pringle's Champion	"	18.80	" 10.
Peas.			
Striped Wis. Blue	April 30.	26.25	not noted.
Prince Albert	"	32.25	"
White Dwarf Marrowfat	"	32.90	"
Canada Cluster	"	37.90	"
Cleveland's Alaska	"	12.00	"
Cleveland's Royal New York	"	11 50	"

This experiment of 24 plots, paths and endlands contained ten acres, 3¾ of an acre of Bavarian oats were sown alongside them, and then 4¼ of an acre White cave oats. Yield of Bavarian oats, 80 bushels per acre; White cave, 60 bushels per acre. The balance of the field was sown with western corn and used by the Dairy Department.

Field No. 2. This field contains 17 acres, and this year was used for pasturing the cows belonging to the Dairy Department. The farm teams turned in and plowed it in the last week of August and first week of September. On the 10th of September, 13 acres of it were sown with rye, 3 bushels per acre.

Field No. 3. This field contains 20 acres. 4 acres on each side were formerly used by the Experimental Department, but were this year sown with common six rowed barley which was but a medium crop. It was also seeded with timothy and clover, but the drouths of May and June prevented its growth, so that in the month of October we plowed and sowed it with rye, 3 bushels per acre. The balance of the field was meadow, principally clover, which yielded about 1¼ tons per acre.

Fields Nos. 4 and 5. This being one half of two fields proper, forms the west corner of the farm and contains 20 acres. On the 22nd day of April 6 acres of it, being the high part of the field, was sown with Goose wheat, which yielded 22 bushels per acre. On the 24th the balance of the field was sown with common "six rowed barley" and seeded to grass. That part of field No. 4 known as the "paddock" was also used as a pasture by the Experimental Dairy Department. The balance of No. 5 is woods.

Field No. 6. This field contains 20 acres and was meadow of a mixture of timothy, rye grass, tall oat grass, lucerne and alsike clover. It yielded about one ton per acre. The quality of the hay was very good and with good bright weather we got it properly cured. In the month of August we had it plowed and 10 acres of it sown with fall wheat and the balance sown with rye. 10 acres of it were sown with the following varieties of fall wheat, Canadian Velvet Chaff, 2 acres; Red Velvet Chaff, 2 acres; Bulgarian, 2 acres; Early Red Clawson, 2 acres; American Bronze, 1 acre; Galizien Summer, ½ acre; Jones' Winter Fyfe, ½ acre.

Field No. 7. This field was slightly manured last spring, plowed, harrowed, and rolled, and seeded with five different kinds of ensilage corn, as follows: Smut Nose, Pride of the North, Pierce's Prize Prolific, Mammoth Southern Sweet, and Horse Tooth.

The field was plowed in the fall of 1890, and during the months of January, February, and March manure was hauled from the farm yard and piled in flat piles not more than 2½ feet in depth. In the month of April this manure was carted over the field by student labor and spread. The coat was light, from 12 to 15 tons per acre. It was then plowed under with a light plowing of 4 to 5 inches in depth and seeded with a grain drill, by stopping enough of the feed cups so as to make the rows 42 inches apart, and from 3 to 5 grains per foot.

The seeding was done between the 2nd and 6th days of May, but the excessive drought of the month greatly hindered its growth, so that I would say that about one-fifth of the seed never germinated. We then went through with a hand planter and filled in the thin places. The horse hoe was run through 8 times and it had two hand hoeings.

The crop stood about 10½ feet high, and had a full crop of ears which were well matured when we commenced cutting on the 15th day of September. The Smut Nose was the lighest crop on the field and earliest maturing; consequently we cut it first. Pride of the North came next, being a heavy crop, well filled ears, and well matured. The other varieties were heavy and matured about the same time, but were fully 8 days later than Pride of the North.

The corn was cut by a simple device made by Mr. F. B. Linfield, who had charge of that part of the work. He made a sort of sleigh with a large knife on each side. The sleigh was hauled by one horse and driven by a small boy on his back. Two men stood on the sleigh and caught the corn as it was cut, and held it until their arms were full, then they dropped it in a pile without stopping the horse. In this way we found that two men and a boy could cut 8 acres per day and make as good a job as we formerly got done with the corn hooks. The silo belonging to the dairy department has been opened and is pronounced by Prof. Dean to be good, sweet ensilage.

Field No. 8. This field contains 20 acres and was meadow, mostly timothy, and owing to the dry weather in the early part of the season, was but a medium crop. It yielded 33 loads which would amount to about 30 tons. The hay was of good quality.

Field No. 9. This field contains 20 acres and was sown with Prussian Blue Peas which were a well-filled crop, but as they are unthreshed we cannot estimate the yield.

Field No. 10. This field contains 20 acres, about one acre of which is taken up with the creamery and stables for dairy cattle; about 5 acres are used by the Horticultural Department as an orchard and for growing small fruits. The remaining 14 acres were meadow, principally clover.

Field No. 11. This field formerly contained 20 acres but this year we added 2¾ of an acre to it from No. 12. A portion of it was manured and prepared for root crop in the autumn of 1890, and during the winter the farm teams hauled out sufficient manure to finish with a coat of about 15 loads per acre. It was piled in large flat piles, and in the months of April and May was carted and spread by student labor, and plowed under.

The cropping consisted of the several varieties of Swede turnips. The varieties were merely sown for the purpose of noticing the quality and growth of the different kinds and were not weighed separately as Mr. Zavitz had a very fine experiment in his department and will give an accurate report of yields. Five acres were sown with mangels of four varieties, viz., Gate Post, Mammoth Red, Golden Tankard and Yellow Globe. One acre was sown with White Vosges, but owing to the drought of the month of May they were not quite a full crop. On the 2nd day of July we set out 1,000 cabbage plants in the space where the carrots failed, and only about one-half dozen of the plants were lost, consequently we have nearly 1,000 heads of cabbage pitted for feed for early lambs next spring.

There was one acre of sugar beets which yielded 19 tons 340 lb. of good clear beets, and were it not for the ravages of the cut worm the crop would have given at least 2 tons more.

There were also 5½ acres of potatoes which, had it not been for the rot setting in, in the month of September, would have yielded an extra heavy crop. After leaving fully ¼ of the crop on the field we put 876 bushels in the College cellars.

We may now mention the results of an experiment conducted with different quantities of manure on root-crop in this field. One acre was treated with 36 loads of manure of average size, and the adjoining acre with 18 loads of manure of equal size and quality. Half of each acre was sown with Swede turnips, and the other half with mangels. The following is the yield given :

½ acre mangels ; 36 loads manure per acre ; yield, 12 tons 1,244 lb.
½ acre mangels ; 18 loads manure per acre ; yield, 10 tons 1,308 lb.
½ acre turnips ; 36 loads manure per acre ; yield, 12 tons 650 lb.
½ acre turnips ; 18 loads manure per acre ; yield, 11 tons 564 lb.

Field No. 12. This field now contains less than 18 acres and was sown with barley and seeded to grass. The barley is yet unthreshed so that we can not give the yield but it looked a fair crop.

Field No. 13. This field contains 16 acres, and was meadow and but a light crop of about 1¼ tons per acre, but hay was of good quality.

Field No. 14. This field contains 24 acres. Seventeen of which are used by the experimental department. The remaining 7 acres are meadow and yielded about 1½ tons of hay per acre, the greater part being lucerne.

Field No. 15. This field is still a pasture field having been seeded down to permanent pasture in 1883 and is still the best pasture on the farm in dry weather.

Field No. 16. This field contains 26 acres and ought to be considered an experimental field proper, although seeded, harvested and threshed by farm labor. It was sown with the following varieties of grain.

Crops.	Acres.	Date of seeding.	Yield per acre.
Barley.			bush.
Oderbrucker	2⅔	May 6	31.19
Cheyne	2	" 7	22.75
Kalina	2	" 7	22.81
Phœnix	2	" 7	23.33
Imperial Scotch	1	" 7	24.41
Chevalier	1	" 7	21.35
Cape	1	" 8	18.63
Oats.			
White Bonanza	2	" .8	50.3
Poland White	2	" 8	62.91
Banner	1	" 8	63.49
Early Calder	1	" 9	failure.
Joanette	1 5/9	" 9	79.40
Oderbrucker	2	" 9	66.60
White Abundance	1	" 11	61.29
Peas.			
Brown Pea	5/9	" 8	24.50
Field "	5/9	" 8	15.90
White Wonder	5/9	" 8	16.50
Cleveland's Advancer	⅓	" 9	27.75
Fall White Marrowfat	⅓	" 9	31.71
Blue Pea	⅔	" 8	10.12½

Field No. 17. This field contains 17 acres, eight acres of which were sown with rye in the autumn of 1890. On June 4th when the crop of rye had attained about full height we cut it with a binder and shocked it up into straight rows, as far apart as was convenient for men to carry sheaves, and immediately teams commenced plowing between the shocks. After it stood two days in shock it was hauled to the barn, passed through the ensilage cutter and firmly tramped into the silo, and covered with planks which were loaded with large rocks. This process of weighting is not necessary with corn as it contains sufficient weight in itself, but rye seems to lose the moisture very rapidly after being packed in the silo. This year we found that it was of much better quality when opened up, but we regret to say that it is difficult to save after the silo is once uncovered.

After the rye was drawn off we finished plowing the ground, harrowed and rolled it, then drilled into light drills, 23 inches apart and seeded with 1 lb. per acre of Dwarf Essex rape. This was cultivated three times by passing a horse hoe through, and grew to be a fair crop. It was well pastured as we turned 110 lambs on to it, which are intended for export next spring.

Four acres on the east side were planted with Horse Tooth corn in rows 42 inches apart, and was cut and shocked, not having room for it in the silo. I may here state that the silo in use at present is not large enough for the number of cattle which we can accommodate in our stable, and although we took every pains in shocking up our corn, we will possibly loose one-fourth of it before it can be used. The remaining five acres were sown with oats and tares for green fodder. We put in ½ acre every Saturday from the 18th of April until the five acres were seeded, and as each half acre was cut off we immediately turned it over with a gang plow and reseeded with barley and peas. This crop we pastured in the autumn with lambs, and we found it a cheap and profitable crop.

Field No. 18. This field contains 26 acres, 13 of which are woods and pasture, and the balance was this year handed over to the experimental department.

Field No. 19. This field contains 30 acres. It was sown with rye in the autumn of 1890. During the winter nearly enough manure was hauled and put in flat piles to give it a light coat of 10 to 12 loads per acre. We cut the rye on the 9th, 10th and 12th of June with the binder, and shocked in straight rows 30 yards apart. Manure was then carted from piles and spread, and balance of coat hauled from farm yard and spread. When the rye was cured we stored it in the barn convenient to the feed room, and at present we are cutting it up and are mixing with corn, and for good cheap feed we have found no equal to this ration. The field was then plowed and prepared as for turnip crop, care being taken to pulverise it thoroughly. We kept the harrow, roller and drill plow as close together as possible, so that it was prepared and seeded with rape as quickly as possible. We made the drills as shallow as possible and used 1 lb. of Dwarf Essex rape seed per acre. The rape was pastured off by lambs which will be reported on in connection with the live stock.

The lambs were turned into the rape on the 19th day of September, and were left until December 14th, when they were taken into the sheds and are now being fed sliced roots, a little oats and hay.

Field No. 21. This field contains 12 acres, 4 acres of which were sown to rye and followed by rape as was done with No. 19 and was pastured off by the same flock of lambs. The remaining 8 acres were sown with fall wheat of eight varieties. The greater part of this field being a high gravelly knoll, only a very light crop was yielded.

The yields were as follows :

1 acre	Longbury Red	16¼	bushels.
1 "	Early Red Clawson	21	"
1 "	Red Velvet Chaff	22	"
1 "	Canadian Velvet Chaff	17	"
1 "	Surprise	17½	"
1½ "	Bonnell	33	"
½ "	American Bronze	19	"
½ "	Bulgarian	21	"

One half acre is taken up by roads and endlands.

LIVE STOCK.

We have not so large a stock in the stables at the close of the year as that of 1890.

A large number were disposed of the 7th of October at the annual sale, and the fresh importations of cattle are still in quarantine. The sheep and swine arrived here on August 12th. The following is a list of the stock on hand at present :

Horses.

Ten horses for farm use, $1,460 ; 8 horses for other departments.

Cattle.

Shorthorns. 1 bull, 3 years old, $500; 7 cows, $1,015; 2 bull calves, $60.

Herefords. 1 bull, 8 years old, $75 ; 3 cows, $700 ; 1 bull calf, $35.

Polled Angus. 2 cows, $450.

Devons. 1 cow, $140 ; 1 heifer calf, $60.

Holsteins. 1 bull, 1 year old, $200.

Jerseys. 1 bull, 1 year old, $100 ; 1 cow, 4 years old, $75.

Grade Cattle. 6 milch cows, $270 ; 11 steers, 3 years old ; 8 steers, 2 years old 2 steers, 1 year old ; 1 heifer, 1 year old ; 2 steers, 6 months old.

Sheep.

Oxford Downs. 4 ewes, $145 ; 1 ram, $65.

Shropshires. 10 ewes, $325 ; 1 ram, $130.

Hampshire Downs. 4 ewes, $147 ; 1 ram, $78.

Suffolks. 4 ewes, $120 ; 1 ram, $78.

Southdowns. 5 ewes, $178 ; 1 ram, $100.

Leicesters. 4 ewes, $157.

Dorset Horned. 8 ewes, $210 ; 1 ram, $42.

639 grade lambs.

Swine.

Berkshires. 1 boar, $100 ; 3 breeding sows, $120 ; 1 young sow, $20 ; 2 boars, $80.

Yorkshires. 4 breeding sows, $200 ; 10 young sows, $80 ; 15 young boars, $75.

Tamworths. 1 boar, $23 ; 2 sows, $40.

Grade Pigs. 17 at $4, $68.

Twenty-eight sheep and 676 ordinary Canadian lambs were purchased and brought to the farm in the months of September and October, and were turned on the rape, where they remained until the 14th day of December, when the rape was well eaten down. They were then taken to the sheds where they are fed a ration of hay, turnips and oats

The following is an exact report of cost of each load :

August 29th, 199 lambs arrived from the counties of Lanark and Renfrew. Average cost per head, $3.36. They were kept on pasture for 18 days, then turned onto rape in field No. 19.

September 14th, 200 lambs arrived from Prince Edward Island. They were very much exhausted having been 5 days and 5 nights loaded, and the weather was very warm. Total cost at Guelph $2.76 each.

October 7th, we brought home 162 lambs and 28 aged ewes. The ewes were sold at $4.07 each, leaving 162 lambs. Cost per head $2.98.

On October 20th, we purchased in the stock yards at Toronto one single deck of 104 lambs, 40 rams and 64 ewes. They arrived in Guelph on the morning of the 21st October. Cost $3.88 each. The ewes and wethers were turned into the rape on No. 21, and the rams were castrated and allowed to remain in the paddock for several days before being turned out.

Altogether we castrated 164 rams, and only one died from the effects of the operation. 130 lambs were shorn in October in order to repeat the experiments of 1890-91. Wool still unsold. Excepting those shorn and ten with long wool the flock was sold to-day (31st December, 1891) to L. O. Barber, of Guelph, at the following prices: one car load to be shipped in January, price $5.50 per cwt. live weight, one car load to be shipped in February at $5.62½. The balance to be shipped before Easter, at $6. Sold to butcher, bad doers, 23. Died, 12. Killed in shipping, 4.

Total value of tools and implements, $2,308.

Your obedient servant,

J. E. Storey.

REPORT OF THE MECHANICAL FOREMAN.

To Prof. Thomas Shaw:

Sir,—By some oversight I find there has been no report from the Mechanical Department for the last year, and to avoid the same thing occurring again I beg to submit the following statement of operations that have engaged the attention of the foreman and students employed in the department during the last twelve months. By referring to the day book I find the first entry of students' names for the term 1890-91 dated October 2nd, and the first work done was preparing for the annual sale, which took place on the 7th, by making shipping crates to remove the stock and erecting seats and tables in barn. Other minor jobs were painting windows and making boxes for connecting drains. On the 13th October we commenced to roof and enclose the sheep shed, the frame of which had been removed the previous summer. This work of enclosing occupied the afternoons of the students' labor until the 18th of November. while at the same time we were erecting a low fence on the north lane, boulevarding eighteen feet on each side of the roadway for a distance of thirty chains with openings to fields and college where required. The work of completing this fence was carried on at intervals during the winter months, and at times when other jobs were not pressing. It was finished about the 1st of May. To give a general idea of miscellaneous work done at various times from December, 1890, to May, 1891, there were five sleigh-racks made for hauling ice, one ice loader; there were six wheelbarrows made for use around the stables; there were two new watering troughs made for use on the farm, and several old troughs repaired For the Experimental Department, there were fifteen hundred stakes and labels made for marking plots in fields, and a number of sign boards for naming grains, roots and grasses. For the garden, there were a number of propagating boxes of various sizes made, and likewise several hundred label pins for naming plants and flowers. About the college, there was repairing of and putting on the winter windows and mending broken seats and desks in classroom. During the month of May we lined with hard maple plank the stalls of the horse stable, repaired the broken castings, and repaired windows and doors all over the stables and barns. We also repaired the windmill. About the middle of June we commenced to erect a netted wire fence along the Brock Road on both sides, one side running the entire breadth of the farm, and half the distance on the opposite side, using over five hundred posts at eight feet apart. The entire height of this fence is 4 ft. 2 in. A board 1x6 and a scantling 2x4 used for a base with a top rail 2x6. The wire is 34 inches wide. The posts were trimmed and peeled and sunk 3½ feet deep. The lumber used was planed, and this fence when painted will have a fine appearance.

List of tools at present in the Mechanical Department, with their present values:— 1 turning lathe, $70; 1 vertical drill, $20; 1 blacksmiths' vise, $7; 1 small vise, $5; 1 set hooks and eyes, $35; 1 ratchet drill, $3; 1 coal stove, $8; 1 wood stove, $4; 1 grind stone, $3; 4 work benches. $16; bench planes, $20.40; other planes, $20; saws, $30; squares, $11,20; rules, $3; boring braces and 4 bits, $10; augers, $3; boring machines, $6; 2 anvils, $10; tongs, $2; cold chisels, $1; 2 4-in. sleeks, $6; 3 framing chisels, $3; 1 set firmer's chisels, $5; 6 nail hammers, $5.40; 2 screw wrenches, $2; 4 hand screws, $2; 1 saw set, $1.50; 1 glue pot, $1; 2 spirit levels, $2.50; 3 pair compasses, $3; 4 crampets, $1; 6 screw drivers, $2.40; 1 chopping axe, $1; 3 hand axes, $6; 2 adzes, $5; 2 broad axes, $6; 6 draw knives, $6; 4 spoke shaves, $2; 2 oil stones, $3; gimlets and brad-awls, $3; paint brushes, $1.80; tool baskets, $2.40; ladders, $4.10; block and tackle, $12; fencing tools, $19; total value, $393.70.

This embraces a general synopsis of the mechanical labor performed by the students and myself during the past year, and before closing my report I may refer to the technical instructions given in the department. At your suggestion, during the winter months there is from half an hour to one hour devoted to explanation of the methods of using carpenters' tools, first, as to their names and uses; second, as to how to put them in working order, viz., sharpening planes and saws; third, as to mechanical names and terms used by builders; and, fourth, as to some of the rules used to obtain the several angles relating to any given angle. The interest taken here, more especially by the leading students, has often carried us beyond the limit of the time. But as these instructions are embraced in the summer examinations, and under your own superintendence, I am pleased to say that in these examinations the majority obtained over 70 per cent.

Your obedient servant,

JAMES McINTOSH.

PART VIII.

REPORT OF THE PROFESSOR OF DAIRYING.

GUELPH, December 31st, 1891.

To the President of the Ontario Agricultural College:

SIR,—I have the honor of submitting the report of the work done in the department under my charge for the year 1891. I shall present it under two heads:

1. DAIRY WORK OUTSIDE OF THE COLLEGE.
2. DAIRY WORK AT THE COLLEGE.

That comprised in the first consists (1) of work done at Farmers' Institutes, and (2) work in connection with the Travelling Dairy.

FARMERS' INSTITUTES.

My first work after my appointment was at the regular winter institutes, which lasted from January 2nd to the 23rd, comprising thirteen meetings. These meetings were held in the counties of York, Ontario, Victoria, Peterboro, Northumberland and Simcoe. A request having come from Cookstown that I should address a meeting of dairymen there the next day, after the last regular institute meeting held at Alliston, with your permission I attended the meeting and took part in its deliberations.

John I. Hobson, Esq., and myself, having been delegated by the Minister of Agriculture to hold some supplementary meetings, we commenced these at Kenilworth, in North Wellington, on February 3rd. Mr. Hobson, however, found that it would be impossible for him to continue at the meetings, as at first arranged, and accordingly I started alone to Muskoka and Algoma, whence a request had come that they be favored with a deputation to hold a series of meetings in that northern portion of Ontario.

The first meeting was held at Bracebridge where, in spite of the cold and snow, a number of sturdy, intelligent farmers had gathered to listen and take part in the proceedings. The President, Mr. Hollingworth, had walked nine miles through the snow that morning to take charge. The day was occupied in discussing various topics, and strangely enough one of them was concerning tree planting. The settlers already realise that there has been too much slashing of the timber, and are seeking to remedy it. In the evening the deputation was reinforced by Hon. Charles Drury, ex-Minister of Agriculture, and all went well.

The second meeting was at Utterson, some ten or twelve miles north of the thriving town of Bracebridge. Several fine farm houses along the way suggested the idea that some had faith in the future of the country. The meeting was fairly well attended.

Taking train at Utterson in the evening, we started for Thessalon, in Algoma, the next point of attack. Our way led northward to North Bay and thence to Sudbury, where we spent Sunday, and thence we went to Thessalon. Here for two days we had the most enthusiastic meetings, it has been my pleasure to attend. The settlers are chiefly from the older portion of Ontario. Men who wished to obtain more land have gone into that country and most of them appear prosperous. A degree of culture and refinement, such as we did not expect to find in this northern country, was exhibited at these meetings, while the discussions were spirited and profitable.

We were loth to leave Thessalon; but, one more meeting having been arranged for at Sault Ste. Marie, we were compelled to take our departure. At the "Soo" we found a number of earnest, enthusiastic men, all possessing great faith in the future of their town and country. All that is lacking, they say, "is a little more assistance from the Government" and a great future is in store for them. It was not a time of year when a proper estimate could be formed of its value as an agricultural district; yet judging from the appearance of the people whom we met, and of the fine agricultural buildings we saw at the "Soo," and of the good reports we heard of the fair held there annually, we should conclude that the land, both at the "Soo" and in the vicinity of Thessalon, is good and only requires proper care and cultivation to grow excellent crops; but a great drawback to this section agriculturally is, that nearly every farmer imagines that there is a gold mine, a nickle or copper mine, or some other valuable treasure hidden deep in the interior of his farm, and is waiting for something to "turn up."

Mr. Drury, after delivering one address at this place, was compelled to return home, and again I was left alone for two days to interest well attended meetings. These meetings were held under the auspices of the Agricultural Society, which is a real live institution; but before the proceedings came to a close a regular institute was formed and a large membership secured. The expense of holding meetings at these distant points is considerable; but the farmers in such localities are very appreciative and willing to sacrifice a good deal to attend the meetings. Hence I think they should be regularly visited, even if some of the older sections should get less assistance than they have hitherto received.

The remainder of February and portions of March, April and June, were devoted to extra meetings at Stratford (Holstein breeders), Elora, Campden, Mt. Elgin, Carlisle, Duntroon, Meaford, Lowville, Waterford, Brucefield, Kincardine and Underwood.

TRAVELLING DAIRY.

Origin.

This is an age characterised by a desire for practical education. It will no longer answer for a man to say, "Go thou and do so and so, and such and such results will follow." People everywhere demand the proof or a practical illustration of your statements. It is very well for one to give a popular or scientific lecture on dairying, or on any other topic, but it is much better to illustrate one's work by practical performance, and thus prove that any new methods which may be recommended, are not only practicable, but better than the old ones. Men everywhere are saying, "I have heard of making granular butter, but never saw it done"; and from all parts of the Province has arisen the cry, "Come and help us."

For the last seven years the professors in all the departments of the college have gone to the farming community for a short time every winter through the medium of Farmers' Institutes, but with a desire to benefit still further those who might wish help in the particular line of manufacturing butter, the Hon. Mr. Dryden conceived the idea of sending the Professor of Dairying with a good buttermaker through some parts of the Province where such help might be desired. Something similar had been done in the neighboring State of New York; but in many ways the New York arrangement was quite different. In their case, they went to farmers' homes and used the utensils of the dairy farmer, and invited people to come and witness the manufacture of butter in the dairy of some of the best buttermakers in the State. With us it was different. We had not very many places where we could go and find modern appliances for the manufacture of butter. It was therefore necessary to take with us a complete outfit of utensils for the making of good butter. This we did; but at the outset several difficulties presented themselves. First, it was something almost entirely new—an experiment—and the best manner of going about the work as yet was unknown. Secondly, would it take? Are not people too set in their methods to change or take hints from anyone? This was a matter that could be settled only after the experiment had been tried. I am happy, however to say that in very few instances did we meet with anything but a cordial reception; and on every side we heard the expression that it was the best thing that had ever yet been done to help the butter trade and farmers generally. What was most encouraging was the fact that in almost all cases persons who attended the meetings, said, "If you will come back again, we are sure you will have a great many more people present. I never thought there was so much to be learned about buttermaking."

The meetings were nearly all held under the auspices of the Farmers' Institutes, the secretaries of whom were communicated with by President Mills. These secretaries usually arranged the place of meeting and secured the cream. Copies of the following circular were distributed in the section where each meeting was held, and most of the local papers took an interest in the work, which assisted greatly:

GUELPH, June 17th, 1891.

DEAR SIR,—By order of the Hon. John Dryden, Minister of Agriculture, I have arranged so that H. H. Dean, B. S. A., our Professor of Dairying, shall spend two months of this summer in giving practical instruction in buttermaking among the farmers of the Province.

Professor Dean will take with him a good buttermaker and all the appliances—such as thermometer, cans, churn, butterworker, &c.—that may be necessary to make a fair churning of butter at each meeting; and he will lecture to those who may be present, on the feeding of cows, the handling of milk and cream, the best methods of churning, working, and packing butter, &c.

Professor Dean will also test samples of milk which may be brought to the meeting, in order that those who care to do so may learn the quality of the milk given by their cows; and any one who wants the milk of his cows tested will please get samples in bottles or jars, and bring or send them to the place of meeting. In order to get a proper sample of a cow's milk, a small amount, say a cupful, of her milk (after it is well stirred) should be put into a bottle or jar in the evening, and the same amount of that given by her the following morning (after stirring) should be added to it. If such samples of the milk given by any herd of cows are properly labelled and brought to the place of meeting, they will be tested, and the results given privately to the owner.

By these meetings it is intended to reach those who make the butter on each farm, and to assist them, as far as possible, in their work. Hence farmers' sons, wives, and daughters are specially invited.

Such a dairy meeting as this will be held under the auspices of the Farmers' Institute at
on the 1891.

Please arrange so as to come or send some of the members of your family.

Yours truly,
JAMES MILLS,
President Agricultural College.

P. S.—For further information apply to Secretary of Farmers' Institute,
P. O.

OUTFIT.

Our outfit consisted of a "Daisy" churn, No. 2, lever butterworker scales, butter print, ladles, cream cans, setting cans, cold water box, pails, salt, etc., in fact, everything required to make good butter, except cream, ice and water. These were supplied by persons near the different places. Besides the buttermaking outfit, we took a twenty-bottle Babcock tester to test the quality of milk given by different cows, for any who might bring samples to the meeting.

During the first tour I was accompanied by Mr. S. P. Brown, of Whitby, who spent two years at our college, and afterwards some time in a dairy in Wisconsin, and W. J. Palmer, B. S. A., a graduate of 1890. Mr. Brown did the work pertaining to the churn, while Mr. Palmer did the milk testing.

THE MEETINGS.

In order to ensure, at least moderately good cream, without which the best buttermaker could not make a first-class article, the names of the persons supplying the cream were ascertained, and the following circular letter sent to each of them:

DEAR SIR,—Your name has been given to me as the person who has kindly consented to furnish the cream to be used for a churning at a dairy meeting to be held at on

I have noted the following points that may be of some assistance to you:

(1) Use milk from healthy cows only; that have been well-fed; that have had plenty of pure water; that have access to salt at all times; that have not been worried or excited; that have been milked regularly.

(2) Care of the milk:

Be careful to not let any impurities get into the milk. Strain immediately after milking. Set at once after milking and straining. Deep cans set in water, with the addition of some ice, are preferable. If shallow pans are used, set where the air is pure, the temperture even, and as cool as possible.

(3) Skimming.

Skim shallow pans at the end of 24 hours, the deep pails at 12 hours. *The cream should always be removed before the milk is sour.*

(4) Care of the cream :

The cream for each churning should be kept in *one vessel* and kept *sweet* until twenty-four hours before churning, stirring at every addition of fresh cream, and several times a day as well. Twenty-four hours before the churning is expected to be done, warm the cream to not over sixty-three degrees, if the weather be warm, and to sixty-five if cooler. Keep at that temperature until ready to be taken to the place of meeting. If it is likely to be too "sour," lower the temperature to about sixty degrees, six or eight hours before churning time ; if not "sour" enough, raise to sixty-five degrees, or sixty-six degrees for the same length of time.

Cream is heated or cooled by setting the cream can or vessel in a larger vessel containing hot or cold water.

(5) The amount of cream required is three or four gallons.

(6) Sample of skim milk will be tested if brought to the meeting.

(7) If possible we should like to know the number of pounds of milk set to furnish the cream for the churning.

Mode of Conducting the Meeting.

The announcements having been made, and the arrangements for cream and water having been concluded, at the hour advertised we were ready to commence operations. What surprised me at a great many places was the number who attended. The months of July and August are very busy ones for the farmer, and everywhere we went we were told, "Oh, there'll not be many out to-day—it's too busy a time." In spite of these predictions we had an attendance varying from 30 to 500. In some places they were chiefly ladies ; and as they are the butter-makers of the province for the most part, we had those who were most likely to be benefited. The preliminaries being got through with, the first thing done after bringing the cream to the proper temperature was to strain it through a strainer dipper into the churn, unless the cream was too thick for proper churning, in which case it was thinned with either skim milk or water, and the churn started by Mr. Brown with the cream at a temperature of from 56° to 62°. While Mr. Brown was churning an address was given by myself on the chief things to be observed in the production of good butter, touching on the importance of having a good cow, of feeding and caring for her properly, but dealing more largely with the care of milk and cream for butter-making. As far as possible, the different points were illustrated by means of charts, milk cans, cream cans, etc., and all the steps were fully explained.

Three things we tried to make quite clear :

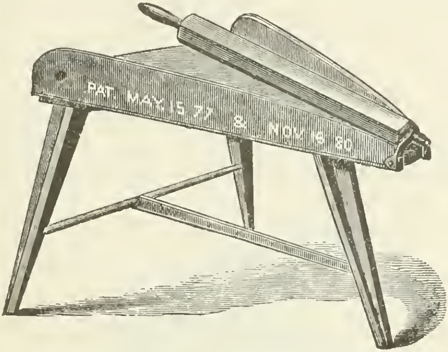
First, that we were not agents to sell the different articles which we carried with us as a great many suspected—in fact one gentleman thought that we had come expressly to a certain place to destroy the sale of a churn which he was manufacturing.

Secondly, that we did not pretend to know everything about butter-making, but were willing to learn anything from any one who could teach us.

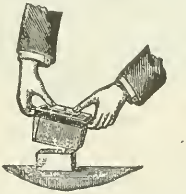
Thirdly, that we were endeavoring to assist farmers to make a better quality of butter for the local markets by illustrating new and improved methods of manufacture and marketing.

We endeavored to make the meetings as informal as possible, giving ample opportunity for asking questions which opportunity was very largely taken advantage of. As soon as the butter "broke," we invited the audience to come to the front and see the granular condition, at which stage we added cold water to chill the particles of butter and effect a more complete separation. The inspection having been completed to the satisfaction of all, the lecture continued until the churning was finished, when, if the audience was not too large, they were again invited to see the condition of the butter. We always laid great stress on two points, viz., the stopping of the churn at the proper time while the butter was still in the granular form, and the thorough removal of the buttermilk by washing. On these two points, which are often neglected, depends to a large extent the quality of the butter—especially its "grain" and keeping quality. As soon as the butter had been washed it was removed from the churn, placed in a butter tub, weighed and salted to suit the person's taste—usually one ounce of salt to the pound of butter as it came from the churn. From those who had never seen butter taken from the churn in any other way than by dipping it out of the buttermilk in large lumps, there came many expressions of delight at seeing it shoveled out in particles resembling grains of wheat.

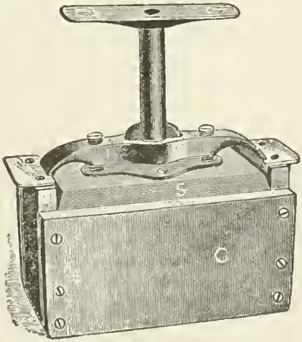
After salting, the butter was worked on a lever worker, of which the following is a cut:



After the working had been completed, the butter was printed with Carver's No. 2 butter mould, which leaves the butter in convenient, rectangular pound prints.



The above cut illustrates the No. 1 Mould and Stamp and the way it is taken from the butter.



The above cut illustrates the No. 2 patented improved Mould and Stamp enlarged. Price $3.00

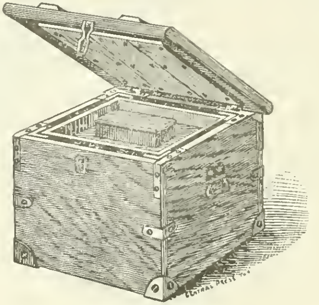
The pound prints were then wrapped in parchment butter paper, which had the following neatly printed on each wrapper, and placed on in such a way as to have the printing on the top of each print :

FRESH BUTTER.

Made and Put up By the

TRAVELLING DAIRY.

These prints, or blocks, thus neatly wrapped, were then placed in a shipping box, which consists of four wooden trays, with an ice chamber made of tin in the centre, the whole encased in a strong, light box. These boxes are of different sizes (holding 20 to 140 lb.) and can be had with ca pacity to suit the purchaser. We always recommended the use of a shipping box with wooden trays, as tin trays rust and spoil the appearance of the butter.



If the travelling dairy has done no more good than to show how butter can be made and sent to market in neat and attractive form it has accomplished a good work, as a great many persons seem never to have thought of any other method of marketing than in the crock or in hand made rolls, done up in rags that have served their purpose in some other capacity.

While the churning and the lecturing had been proceeding Mr. Palmer was busy testing samples of milk. Great interest was manifested in this. As many as 47 samples were brought to one meeting ; and altogether during the months of July and August 378 samples were tested. The method of testing, its value and importance, were fully explained by Mr. Palmer, and the results of the tests given to those who brought the samples ; also where great differences in the quality of the milk were observed this was pointed out.

As one instance of the value of having a tester in connection with our work, note the following : At one meeting no arrangements had been made for cream (as indeed was the case at a number of places), and after driving about for a couple of hours we managed to collect about two gallons, consisting of cream supplied by four different persons, some of which was skimmed from the milk and taken directly to the meeting and churned after mixing it with some that was quite sour. The test of the buttermilk from this sample contained 2.5 % fat, which is a loss of over 2½ lb. of butter in every 100 pounds of buttermilk, thus clearly showing the ill effect of mixing sweet and sour cream just before churning. Nevertheless it is a practice quite common among buttermakers.

Our first meeting was held at Islington, York county, on June 30th. Between that date and August 21st, the date of our last, we held meetings at the following places in the counties of York, Ontario, Simcoe and Durham : Snyder's Settlement, Vaughan Town Hall, Tottenham, Nottawa, Minesing, Crown Hill, Coldwater, Orillia, Scotch Settlement, Dunkerron, Newmarket, Queensville, Stouffville, Uxbridge, Sunderland, Cannington, Beaverton, Port Perry, Greenbank, Utica, Columbus, Claremont, Whitby, Seagrave, Bowmanville and Orono, making twenty-seven meetings in all. At some places the heat was intense ; this, together with having a great many people packed in a close, ill-ventilated building, made it almost impossible to have the butter as nice and firm as we should have liked it. The persons supplying the cream received the butter and did as they liked with it ; usually it was sold at the meeting, and as an instance of what some people are willing to pay for an article if it suits them, at one meeting the butter was sold for 50 cents per pound.

The Travelling Dairy at the Fall Exhibitions.

There having been a number of applications for the dairy at the fairs, it was decided we should attend as many as possible. It was found, however, that one could not be present at all the places which urgently appealed for assistance, so a second dairy outfit in charge of Mr. Palmer with Mr. Rogers, experimentalist in our own dairy, as buttermaker, was sent to the London Fair ; the other which, with the assistance of Mr. Brown, I took charge of myself, attended the following fairs :

Gananoque (3 days), Toronto (4 days), Lanark (2 days), Peterboro (2 days), Whitby (1 day), Almonte (1 day), Lindsay (1 day), Port Hope (2 days), Collingwood (2 days).

The next day after reaching Guelph Mr. Palmer, Mr. Brown and myself again started for a series of meetings in the County of Essex, which included the fairs at Comber (1 day), Leamington (3 days), and Harrow (2 days), besides meetings at Kingsville, Cottam, Essex Centre, Amherstburg, Canard River, Maldon Town Hall, South Woodslee, Belle River and Windsor, making, in this second tour, a list of twelve fairs (not including London) and nine other dairy meetings. Altogether, since Jan. 1st, 1890, I have attended 31 institute meetings, and 48 meetings of the travelling dairy, some of which lasted three and four days.

While on the first tour we found that unless persons came provided with paper and pencil it was difficult for them to remember temperatures, amount of salt to use, etc., so, with your permission, I had a number of copies of this pamphlet printed, which was distributed at all the meetings on the second tour, and, when asked for, a number of copies were left with merchants to be given to their customers.

HINTS ON BUTTERMAKING.

The Buttermaker. Do not consider that you know everything there is to be known about buttermaking. Be willing to pick up a hint wherever and whenever you can. Observe the strictest cleanliness in every detail of the manufacture of butter—in the care of the cow, the milk, the cream, and in everything until the butter is in the hands of the consumer. Do not make the butter in the same clothes in which you milk the cows.

The Cow. Get a good cow that will make at least 250 pounds of butter in a year. Feed the cows that you have, liberally, house comfortably, care for kindly, and milk regularly. Then dispose of those that do not respond. Give pure water only, and keep salt where it can be reached by the cows at all times.

Utensils. Procure proper utensils, because with the best there is a great deal of labor in making butter. Among them be sure to include a good dairy thermometer. (A glass one preferred.)

Milk House. A dry, cool cellar of uniform temperature, free from bad odors or smell of vegetables is a very good place in which to keep milk. Milk or butter when kept for any length of time where such smells exist, quickly absorbs these smells, becomes tainted and lessened in value. A milk house with double walls can be constructed quite cheaply.

Milking. Milk only where the air is pure ; brush the cow's udder before commencing ; milk rapidly and quietly ; strain immediately, and get to the place of setting as soon as possible.

Setting. Set while the milk is warm. Set in creamers or deep pails. These are better than shallow pans, especially in summer. Put the cans in water at from 40 to 45 degrees,—keep it at that temperature—and skim at the end of 12 hours in summer and 24 hours in winter. A water tight box about two feet deep will be a convenient place in which to put the pails where a creamer is not used. Cans may be used which are either put wholly under the water or set in water which is as high as the milk in the can.

If shallow pans are used, skim at the end of 24 hours in summer, and 36 in winter, and always before the milk becomes sour and thick. Keep the temperature of the milk room even at from 50 to 60 degrees.

The Cream. The cream should be kept sweet until 24 hours before churning by keeping it cool, either in the creamer box or in a cool cellar. Get a cream vessel (tin is preferable) large enough to hold the cream for a whole churning. If there is not sufficient for a churning from one skimming, stir the cream thoroughly at every addition of fresh cream.

In summer warm the cream to 63 or 65 degrees, twenty-four hours before you wish to churn and it will be about the right degree of sourness or ripeness in that time, but as soon as it becomes slightly thickened and sour churn it. Never allow the cream to become warmer than 63 degrees in warm weather. In winter the ripening temperature will be from 64 to 70 degrees.

All changes in cream should be effected gradually. Never add hot or very cold water directly to the cream, but set the cream vessel in another containing warm or cold water, stirring the cream all the time it is warming or cooling. Do not allow the milk or cream to freeze. If the butter is white a small amount of good butter colour may be added to the cream, just before commencing to churn.

Churning. Use a churn without paddles or dashers on the inside. Churn often in summer, not less than twice a week. The churning temperature for summer will be from 56 to 60 degrees, and winter 64 to 68 degrees. Start the churn slowly (50 turns to the minute, increasing to 60 or 70 after a few minutes) and if a close covered churn, such as the Daisy, be used it will be necessary to remove the plug at the bottom of the churn two or three times during the first ten minutes. When the butter "breaks" add one quart of cold water to the churn for every pailful of cream, and then continue churning until the butter is the size of grains of wheat, when the churn should be stopped, the buttermilk drawn off and as much water added as there was cream at the commencement. Give the churn a few rapid turns and draw off this water; repeat the operation, when the water should come away quite clear.

Never "gather" the butter in a solid mass. If you do, you enclose a considerable amount of buttermilk in the butter. Two bad effects will follow: (1) the butter cannot be salted evenly; (2) the buttermilk left in the butter will cause it to become rancid in a short time—in other words, it will destroy the keeping quality of the butter.

Salting. Fine salt at the rate of from ½ ounce to one ounce to the pound of butter may now be sprinkled on the granulated butter in the churn, or the granular butter may be removed to a cool room and placed on a slanting table which has butter cloth spread on it, and there salted and allowed to drain for 3 or 4 hours, or over night. Afterwards work very slightly and pack or print at once if for immediate use. If it is to be kept any length of time, it may require two workings.

Working. Be careful not to overwork the butter, injuring the grain and making grease of it. Work by pressure and not by friction.

Marketing. Put up in a neat and attractive form, and get it to the consumer as quickly as possible. If it is thought better to do so, it may be packed solidly in tubs or crocks and covered with a cloth, or a salt-plaster so as to exclude the air. To this salt-covering, fresh brine should be added from time to time.

With the last meeting at Windsor, on October 24th, closed this season's work, though not nearly all the applications have been filled.

FUTURE WORK.

To meet the already large and increasing demand for such work as this, I would recommend that two such dairies be equipped for next year, and that they be placed on the road at any earlier date than it was possible to commence this year. Instead of going by train, I should recommend that a team and wagon be furnished; as we found that a great many places were inaccessible by train and it became necessary to hire a number of rigs, which largely increased the expenses.

That such work is needed even in cheese districts where considerable butter is made, is evinced by the following clipping, which appeared in the editorial columns of one of the leading western daily papers:

BETTER BUTTER WANTED.

Persistently, "in season and out of season," though there is really no "out of season" for this work, the *Advertiser* has urged the necessity for improved and systematic methods in butter making. The "Travelling Dairy" started this season in the Toronto district is, as we have previously pointed out, a capital move, as it illustrates by actual operation, in presence of farmers and their families assembled, how butter should be made. The same idea has previously worked well in New York State and elsewhere, and the Minister of Agriculture, Hon. Mr. Dryden, President Mills and Professor Dean, of the Agricultural College, should see that other portions of the province receive the benefit of this sort of itinerant education in dairying. We need the "Travelling Dairy" badly here in the western part of the province. We believe the promoters were apprehensive that it might seem to conflict with the cheese factory system which has been so widely and successfully developed. Not at all. Were this a creamery or butter factory district the plea might be set up that it was encouraging private butter making as against an established factory plan, though we believe it would really in the end help such institutions rather than otherwise. The more information the people get about the details of successful dairying the better for all concerned, from the cow to those who consume the products into which her milk is manufactured. In localities like Middlesex, Oxford and adjacent counties the cheese factory system has been brought to a high state of perfection, and the people not having taken to butter factories or creameries, butter-making drags on in the same old ruts. With what wretchedly variegated results the average customer who is supplied with butter from a grocery for say one year very well knows. We submit, therefore, to Mr. Dryden and his advisers in this matter that in a cheese district above all others the "Travelling Dairy" is most urgently needed.

Hoard's Dairyman, in a recent issue, very truthfully remarked:

"When the manufacture of butter has reached as near the perfection of uniformity and best quality that the making of cheese has, it will add some scores of millions of dollars per annum to the income of the milkers of the cows. Why is the percentage of success more in cheese making than in butter making? Simply because the great bulk of it is made in factories, and by skilled hands, using, as a rule, good tools, while the milk for the bulk of the butter-making is yet entrusted to incompetent persons who use poor facilities, and fail to take care of the butter after it is made."

The "Travelling Dairy" exhibits the best available utensils the farmer can use in butter making, and he sees them handled by experts whose methods he can readily adopt, for they are simple. Creameries cannot be hurried into existence, and where the cow population is too scattered would not likely prove profitable, nor will they supplant cheese factories. Meanwhile, then, let private butter dairying be put on a more systematic and intelligent basis. Good results will surely follow. Just as good butter can be made in the private dairy as in the creamery if the dairyman will get the requisite appliances and knowledge and apply the skill, from the feeding and stabling of the cows till the "gilt-edged" article reaches the customer. The latter will surely be better satisfied to receive week by week butter that is uniform in character and excellent, and be not unwilling to make such return in cash as will be a fair compensation to the producer.

Its Relation to Creameries and Cheese Factories.

It may be thought by some that the travelling dairy will hinder the advancement of creameries and cheese factories in the province; not so in my opinion.

In every cheese district there is some butter made before the factories open in the spring, and again after they close in the autumn. This butter, in a number of instances, is poorly made, and goes to swell the vast amount of poor butter placed on the markets in our villages, towns and cities, some of which ultimately finds its way to Great Britain, and is one cause of the bad reputation which we have as a butter-producing nation; and in a great many instances it goes to grease the axles of the waggons throughout the country. If those living in cheese districts would support a creamery by changing the cheese factory into a butter factory at the close of the cheese season which, I am glad to say, is being tried in a few places this year, the value of our dairy output would be greatly increased. In some cases, however, this may be impracticable, for a time at least, and until such creameries are established much good will be done by practical lessons in private butter-making.

As to creameries, it may be said that they are not so popular as was at first expected' and indeed in the northern part of Ontario, where the roads are not the best and the population scattered, it will be some time before creameries will be at all practicable; in the meantime it is very important that the butter which is made in private dairies should be the very best. In the northern section, including Muskoka and Algoma, the pastures are very rich, and give a flavor to the dairy products such as is not found in other parts of the Province. Fine springs of water, too, burst from the hills and rocks, making it possible to produce dairy articles of the very highest quality. With such natural advantages, then, we would expect the best goods from such a section; but what is the actual state of affairs? At Thessalon last winter a merchant said, "I have 25 or 30 tubs of butter in my storehouse that cost me from 15 to 20 cents per pound, and I'll sell it to any one for *4 cents* per pound." What was wrong? There was lack of a little knowledge in the art of butter making. So it is all over the province. While there are a great many good butter makers there are a great many more poor ones. The most significant fact in connection with the matter is, that it costs no more to make a good article than a poor one, but the poor is made at a loss and the good at a profit.

Merchants are largely interested in this butter question, and I took the trouble to inquire of nearly all the dealers in most of the places where we went what their views were concerning the question, and almost without exception they said: "I wish the butter business was far enough away. I never made any money handling butter. If I can come out even I shall consider myself pretty lucky." What a storekeeper usually means when he comes out even is that if he pays 14c. for butter in trade and sells it for 14c. cash he considers that he has done very well, having made the profit on his goods for the labor of handling the butter.

Storekeepers as a rule would welcome the advent of a creamery or of any change that would relieve them from the necessity of handling the butter so long as they *still continued to receive the trade.* But here is where the difficulty presents itself. Some are afraid that if they lose the butter trade they will lose their customers, and they object to a cash market on this account. So long as trading butter at the store continues so long will there continue to be poor butter made, as this system offers no inducement to the makers of good butter. All receive the same price no matter what the quality, because a merchant dare not tell a good customer that her butter is inferior lest such a customer should instantly leave him and go to trade elsewhere.

The makers are not responsible for all the poor butter that is found in stores. Out of a large number of visits made to storekeepers only one invited us to visit his store room. It was with pleasure that I inspected the store room of Mr. Christopher Moore, of Orillia, who has a nicely furnished room in the basement of his store, in which butter *only* is kept. The quality of butter found there is an indication that he does not buy indiscriminately, but as he told us, he buys good butter, and that only. At some of the other places we *asked* to see where they kept their butter and we found several of them simply unfit to keep any dairy goods whatever.

An Educator for Creameries.

While I am satisfied that we shall not be able to manufacture an article suitable for export, unless it be made on the co-operative plan, owing to the difficulty of obtaining a uniform article, it will be some time before butter in Ontario is made in bulk at creameries, and in the meantime this method of disseminating knowlege will accomplish good work in two directions. It will improve the quality of butter offered for sale in our local markets and thereby increase the demand; for who will not eat *more* butter if he can get it good, than if it be poor, and who will not pay a higher price for a good article than for a bad one?

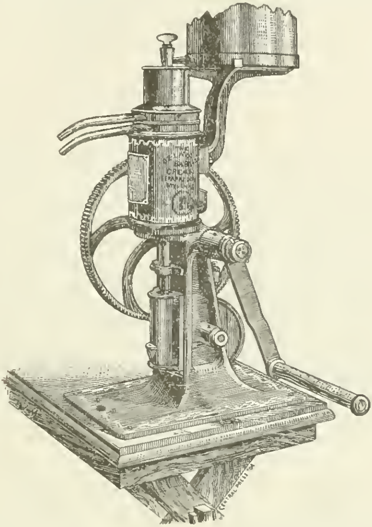
All this goes to prove that when the circumstances are favorable for creameries, persons who cannot find private customers or who have them and would rather not take the trouble of making the butter at home, will be educated to the proper care of milk and cream for creameries, without which no creamery can be successful. What is one of the greatest drawbacks to creameries in operation at present? Want of proper care in the management of the cows, and milk, which produce the cream supplied to them, but where information regarding these branches of the dairy industry has been brought to the people and the best methods to be adopted, explained and illustrated, a broad foundation will have been laid on which a profitable creamery industry on either the cream gathering, or separator plan may be built.

DAIRY WORK AT THE COLLEGE.

Experimental Dairy.

The first thing that engaged my attention after the regular institutes, was the equipping of the Experimental Dairy. Previously there had been few appliances for carrying on anything like experimental work. In the west end of the present creamery are four rooms which were at one time used as a dwelling for the buttermaker of the creamery. One of these was supplied with experimental churns, means for printing butter, etc., and used as the make room or buttery. In another was placed a Cooley creamer, a Brampton creamer, a water box in which to set shot gun cans, one large shallow pan with water tank below to cool the milk after setting, racks for setting shallow pans, and a De Laval Baby separator, capacity 250 lb. of milk per hour. The third room was fitted up with means for testing milk in which there are all plainly labelled, the chief instruments now in use for testing milk, including the Babcock tester, the Beimling tester, lactoscope, pioscope, lactobutyrometer, cream gauges, lactometers, and per cent. jars. By this means students are enabled to become familiar with the appearance of these instruments and by using them come to understand their working. The fourth room is used as a store room.

While our chief object was to carry on practical and scientific experiments, at the same time we endeavored to make the dairy a remunerative branch of the institution.



The De Laval New "Baby" No. 2 Hand Cream Separator.

The Creamery.

The Minister of Agriculture having intimated that he did not wish the time of the Professor of Dairying to be taken up with the management of the Ontario Creamery, as in the past, this decision was communicated to the committee of management of last year, when a meeting of the patrons was called and it was decided to appoint a committee to carry on the creamery on their own responsibility. This was done; the use of the creamery and plant was granted to the patrons, while the office and the west end of the building were reserved for the use of the department.

The creamery had a very successful season, having manufactured 32,000 lb. of butter, which brought an average price of 20½ cents per pound. The cost of manufacturing was 4 cents per pound, and the patrons thus received net 16½ cents for sufficient cream to make one pound of butter. The creamery was in operation 126 days, commencing May 26th, closing September 29th.

Being thus relieved from the management of the creamery, I had much more time to devote to other work.

Instruction to Students.

The instruction given to students during the year has been of a twofold nature. First, during the winter and spring terms one student was sent each afternoon to the dairy where he was instructed in the testing of milk and making of butter. Each was required to do the work himself under the supervision of either myself or the man in charge of the dairy. By this means, they were enabled to become acquainted with the practical working of the different methods talked about in the class room. During the spring term, after the creamery commenced operations, three to four students came each morning to receive practical instruction from Mr. McHardy, the buttermaker. This feature of the dairy instruction we wish to make more prominent with our increased facilities, as we regard it all-important that our students become *practical* dairymen.

The other method of instruction has been by lectures in the class room. Most of these were given in the spring term. I think, however, that it would be better to have at least some of the dairy lectures during either the fall, or winter term, as a number of students were compelled to go home each year for all or a portion of this spring term, and thus they missed the lectures which were given at the time.

A Short Dairy Course.

Believing that the time has arrived when provision should be made for a short course in dairying, I am pleased to say that when the recommendation was made, you heartily endorsed it ; and that already steps have been taken towards making provision for a suitable building, and the necessary apparatus.

Last year a number of our most enthusiastic cheesemakers spent some time at the Dairy School, of Wisconsin, to become better acquainted with what might be termed the more scientific part of dairying. Can we afford to allow our people to go to a neighboring State to obtain instruction, which might be furnished at home at much less cost ?

There have also been some inquiries regarding a course of instruction in buttermaking and cheesemaking. Both of these have been partially filled by the Travelling Dairy and the Dairy School established at Tavistock by the Dairymen's Association under the charge of Mr. Bell. The difficulty of leaving work at home during the busy season will necessarily be somewhat of a drawback to the Dairy School. If such instruction could be given during the winter months in our own college, and at the same time if the testing of milk, the running of separators, extractors, etc., were explained, together with practical work in the manufacture of both butter and cheese, no doubt it would tend to fill a growing want among leading dairymen.

Fodder Corn for the Experimental Dairy.

Formerly the custom has been for the dairy department to grow the corn for the silos, but this year an arrangement was made with the farm department to grow the corn and fill the dairy silo. Accordingly, about 150 tons of corn were ensiled, which I am glad to say is turning out very well.

Last year the corn was too immature when put in. I found last year that the area of the silo (21 x 22 x 18 feet deep) was too large for the number of cows kept and a great deal of it spoiled on the side when cut down with a knife. This year before filling, I had an upright piece of timber (6 x 6) reaching to the roof of the barn placed in the centre of the silo, and a plank partition on the granary plan, put through the middle of the silo. So far we have found that it works nicely. The ensilage on the one side is good, close to the plank partition ; but at the present writing we have not commenced feeding from the other side. In building silos the area exposed ought to correspond to the size of the herd, so that a layer may be taken off the entire exposed surface each day. By having the ensilage much lower towards the front it is an easy matter to take off enough every day to prevent spoiling.

THE EFFECT OF FOOD ON THE QUALITY AND QUANTITY OF MILK.

There is considerable difference of opinion regarding the effect of food upon milk, especially upon the quality of milk. Nearly all concede that the food influences the quantity of milk to a large extent, while some claim that the quality of the milk is dependent largely upon the peculiar constitution of the animal. As a sample of these opinions we quote the following :

In Bulletin No. 9 of New Hampshire Experiment Station, Prof. Whitcher says, "Let me repeat and emphasise the fact, that *breed* and *individual characteristics* are the two great factors that determine the richness of milk. . . . By judicious or injudicious feeding the amount of milk daily may be very largely varied, but the quality of the product will be chiefly determined by the individuality of the cow. . . . *Quantity* is the result of food influence. Quality is the result of the make up of the animal."

Some conclusions quite dissimilar to the above are based upon an experiment recorded in Bulletin No. 14 of of the Iowa Experiment Station :

"1. The kind of food had a decided and material effect upon the quality of mik produced, as regards percentage of fat and solids. . . ."

"2. Change of food influenced the quality of milk considerably more than it did the quantity. . . ."

"3. The ratio of fat to "solids not fat" was considerably modified by the change of food."

Dr. Babcock is quoted as saying : "I do not believe that the individual character of any animal so far as it is manifested in the quality of milk, can be materially changed by the kind of food."

The object of the experiment, the results of which are here given, was to determine, if possible, what relation food has to the quality and quantity of milk given by individual cows. Six grade cows were chosen which were as nearly alike in time since calving and milking capacity as it was possible to obtain them. They were divided into three lots with two cows in each lot. The feeding periods on each ration with each lot lasted 21 days with one week preparatory before the final change to the full ration. The experiment proper commenced on March 22, 1891, and ended June 7, covering a period of 77 days.

There are two important points, however, which we need some light upon. The first one is, the effect of the preceding ration upon the succeding one as where a change is made from a wide to a narrow ration and *vice versa*, Prof. Atwater, in speaking of this point, says : "Leaving out of account for the present the individuality of the animals, the residual effect of the ration in the first test period upon the apparent product of the second period was unknown."

The second point is, whether the quality of the milk can be affected in so short a period of time. Some claim that it can and others that it cannot.

WHENCE COMES THE FAT OF THE MILK?

The old school of physiologists taught that the manufacture of organic constituents was a power possessed only by vegetables, and unknown in animals, but Liebig proved that the fat contained in the milk of the cow was greater than could be accounted for by the fat present in the grass which she ate. Lawes and Gilbert also showed that in the case of the pig for every 100 parts of the fat in the food there were stored up as fat in the body 472 parts, so it would seem that the fat found in the animal body is in part at least formed out of something which is not fat.

The general conclusions as to the source of animal fat are that it may be formed from the fat of the food, from the protein (or muscle forming substances) of the food, and from the carbohydrates fed to the animal. These conclusions are based almost altogether upon the results of German investigations.

Will the same conclusions hold in regard to the fat of the milk? Dr. Foster says : "All the evidence we possess goes to prove that the fat (of milk) is formed in the cell through a metabolism of the protoplasm. · · · Thus the quantity of fat present in milk is largely and directly increased by protein but not increased, on the contrary diminished by fatty food."

"The origin of the fat is, without doubt, in a process of fatty degeneration of the protoplasmic cell contents, for the amount of fat in milk, so far from being increased, is actually diminished by an increase of fat in the food ; while further the fats in milk do not necessarily coincide in nature with the fats of the food. · · · A fatty diet may help the milk secretion, but not by an immediate transfer of the fat of the food to the milk."—Dr. Smith in "*Physiology of Domestic Animals*."

"The fat, in the form of an emulsion or exceedingly intimate mixture, in particles so fine as to be invisible, is absorbed directly into the circulation and is carried on with the blood to be deposited where the exigencies of the system require it. It is deposited in the tissues, or in masses in various parts of the body, and in females, at and after the birth of their young, is carried in large part to the udder, where it is first deposited in the glandular cells of the udder, and is then mingled with the copious secretion known as milk. · · · In the practice of feeding we are guided by two principles, viz., that certain products are composed of certain elements, and that if these elements are supplied to an animal we may secure the desired products."—"*The Dairyman's Manual*," by Henry Stuart.

The following statement refers to the six cows of this experiment :

Cows.		Calved.	Bred.
Lot I	No. 1	January 7th, 1891	June 29th.
	No. 2	January 13th, 1891	October 13th.
Lot II	No. 3	February 6th, 1891	August 23rd.
	No. 4	February 13th, 1891	April 14th.
Lot III	No. 5	January 15th, 1891	September 9th.
	No. 6	January 29th, 1891	August 3rd.

ANALYSIS OF MEALS. The analysis of the meals and butters, and the determinations of the solids not fat in the milk were made in the chemical department. The fat of the milk was determined by the Babcock test.

	Water.	Albuminoids.	Fat.	Carb.	Fibre.	Ash
Nutted cake	9.98	31.62	6.29	41.16	6.62	4.33
Ground oil cake	10.25	32.79	8.04	37.53	6.88	4.51
Cotton seed meal	9.58	36.86	9.91	29.98	7.13	6.56
Oatmeal	14.26	11.68	4.25	60.12	7.45	2.24
Pea meal	14.65	23.68	1.65	53.16	4.53	2.33
Corn meal	13.18	17.26	4.00	62.44	1.70	1.42

The pounds of digestible matter in rations fed are shown as follows :

Rations.	Albuminoids.	Carb.	Fat.	Nutritive ratio.	Cost per day.
German standard for milk cows	2.5	12.5	0.40	1 : 5.4	
No. 1—					
Ensilage, 30 lb.	0.24	2.80	0.15	1 : 25.6	13¾c.
Oat straw, 20 lb.	0.08	8.27	0.14		
Hay (cut) 10 lb.	0.30	3.79	0.12		
Total pounds fed	0.62	14.86	0.41		
No. 2—					
Hay (cut) 20 lb	0.61	7.59	0.25	1 : 3.9	24c.
*Linseed oil meal, nutted, 2 lb.	0.55	0.79	0.11		
*Linseed oil cake, 2 lb	0.57	0.72	0.14		
*Cotton seed meal, 5 lb	1.63	1.30	0.50		
Total pounds fed	3.36	10.40	1.00		
No. 3—					
Hay (cut) 20 lb	0.61	7.58	0.24	1 : 6.8	33c.
*Pea meal, 4 lb	0.83	2.20	0.38		
*Oatmeal, 5 lb	0.55	2.41	0.16		
Cornmeal, 8 lb	0.79	4.25	0.27		
Total pounds fed	2.78	16.44	1.05		
No. 4—					
Ensilage, 50 lb	0.40	4.66	0.25	1 : 8.4	12¾c.
Hay, 6 lb	0.18	2.27	0.07		
Bran, 5 lb	0.64	2.20	0.12		
Total pounds fed	1.22	9.13	0.44		

*Digestion co-efficient from Armsby's Manual.

Digestion co-efficients of all the other meals and fodders, and the composition of those whose analysis is not given, except ensilage (College report 1890) were taken from Bulletin 17, N.Y. Station.

Showing effect on quality when ration No. 1 was fed.

Date.	No. cow.	Average p. c. fat.	Average per cent. solids not fat.	Average per cent. total solids.	Weekly lb. fat.	lb. butter in two days.	Ration.
Lot I.							
March 9—15	1	4.07	....	....	8.22	....	Winter. Ration No. 4.
" 9—15	2	3.68	....	....	7.71	....	
" 16—22	1	3.61	8.45	12.06	6.57	....	
" 16—22	2	3.38	8.23	11.61	6.71	....	Preparatory.
" 23—29	1	3.75	8.71	12.46	5.93	3.34	Ration No. 1.
" 23—29	2	3.37	8.37	11.74	5.70		
" 30—April 5	1	4.08	5.74	9.82	5.18	....	
" 30— " 5	2	3.35	7.35	10.70	6.02	....	
April 6—12	1	3.47	8.56	11.97	5.15	2.75	
" 6—12	2	2.92	7.81	10.73	4.09		
Average for 3 weeks	.....	3.49	7.76	11.07	10.70		
Lot II.							
May 11—17	3	3.12	9.45	12.57	6.07	....	Preparatory.
" 11—17	4	3.49	8.07	11.56	7.82	....	
" 18—24	3	4.45	7.03	11.48	7.08	....	Ration No. 1.
" 18—24	4	4.65	7.16	11.81	8.30	....	
" 25—31	3	3.79	7.98	11.77	5.57	3.25	
" 25—31	4	4.00	8.15	12.15	6.50		
June 1—7	3	3.65	7.62	11.27	5.40	3.25	
" 1—7	4	3.38	8.19	11.57	4.53		
Average for 3 weeks	.....	3.99	7.69	11.67	12.46		
Lot III.							
April 13—19	5	3.65	8.96	12.51	6.68	....	Preparatory.
" 13—19	6	3.18	8.43	11.61	6.15	....	
" 20—26	5	3.59	8.13	11.72	5.62	2.37	Ration No. 1.
" 20—26	6	3.00	7.79	10.79	4.80		
" 27—May 3	5	4.01	8.03	12.04	6.24	3.00	
" 27— " 3	6	3.28	8.25	11.54	5.07		
May 4—10	5	4.15	7.66	11.81	5.62	....	
" 4—10	6	3.14	7.65	10.79	4.40	....	
Average for 3 weeks	.....	3.53	7.92	11.45	10.58		

Lot I. Cow No. 1 on the ordinary winter ration gave an average per cent. of fat in one week of 4.07 ; and her average the last week on which she ate the ensilage and straw ration was 3.47—a decrease—but it will be noticed that during the week previous her average was 4.08. There is a slight decrease in the per cent. of fat in her milk and quite a marked decrease in the total pounds of fat produced (8.22 to 5.15 lb.) in a week, which is due mostly to the decrease in the quantity of milk. The solids not fat remained about the same. No. 2 decreased in her percentage of fat from 3.68 on winter ration to 2.92 on No. 1 ration, and a total weekly yield of fat from 7.71 lb. to 4.09 lb. the last week of the period. The per cent. of "solids not fat" also decreased from 8.23 to 7.81.

Lot II. The average per cent. of fat in this lot for the two weeks previous to commencement of the experiment proper, was 3.93, for the 21 days succeeding on hay and oil meal rations it was 3.47 ; for the next period of 21 days, on the pea, oat and cornmeal ration it was 3.81, and for the period in which they received the ensilage, straw and hay ration it was 3.99. If anything this lot showed an increase in fat per cent. at least over the two preceding periods when they were receiving a much richer diet. How much of this was due to the influence of the previous ration, and how much to the individual characteristics of the cows we are not prepared to say. The "solids not fat" were 7.69 per cent. as against 8.65 per cent. and 8·51 per cent. in the two previous periods.

Lot III. Per cent. of fat 3.53 on ration 1 "solids not fat" 7.92, as compared with 3.22 and 8.41 in the preceding, and 3.49 and 8.54 in the succeeding period—an *increase in per cent. of fat, a decrease in per cent. of solids not fat as in all cases when this ration was fed.*

Showing effect on quality when ration No. 2 was fed.

Date.	No. cow.	Average per cent. fat.	Average per cent. solids not fat.	Average per cent. total solids.	Weekly lb. fat.	lb. butter in two days.	Ration.
Lot I.							
April 13—19	1	3.41	8.41	11.82	5.49	....	Preparatory.
" 13—19	2	3.03	8.10	11.13	4.95	....	
" 20—26	1	3.72	9.74	12.40	7.09	4.75	Ration No. 2.
" 20—26	2	3.75	8.28	12.03	7.33		
" 27—May 3	1	3.49	8.70	12.19	6.96	4.5	
" 27— " 3	2	3.43	8.36	11.79	7.05		
May 4—10	1	3.46	9.33	12.79	6.73	....	
" 4—10	2	3.75	7.61	11.36	7.82	....	
Average for 3 weeks	.....	3.52	8.67	12.09	14.32		
Lot II.							
March 9—15	3	3.64	....	....	8.54	....	Winter.
" 9—15	4	4.41	....	....	9.15	....	
" 16—22	3	3.75	7.70	11.45	8.81	....	Preparatory.
" 16—22	4	3.94	8.51	12.45	8.73	....	
" 23—29	3	3.44	8.97	12.41	8.15	4.25	Ration No. 2.
" 23—29	4	3.46	8.97	12.43	7.89		
" 30—April 5	3	3.40	8.38	11.78	7.91	....	
" 30— " 5	4	3.85	7.41	11.76	9.49	....	
April 6–12	3	3.01	8.89	11.90	6.87	4.84	
" 6—12	4	3.68	8.80	12.48	8.96		
Average for 3 weeks	.....	3.47	8.65	12.13	16.44		
Lot III.							
May 11—17	5	3.32	8.10	11.42	5.23	....	Preparatory.
" 11—17	6	2.84	9.50	12.34	4.47	....	
" 17—24	5	3.60	....	....	6.41	....	Ration No. 2.
" 17—24	6	3.40	....	....	6.10	....	
" 25—31	5	4.03	8.19	12.12	7.46	3.5	
" 25—31	6	3.56	8.12	11.68	6.92		
June 1—7	5	3.48	8.74	12.22	5.93	3.25	
" 1—7	6	2 90	9.10	12.00	4.69		
Average for 3 weeks	.....	3.49	8.54	12.01	12.50		

Showing effect on quality when ration No. 3 was fed.

Date.	No. cow.	Average per cent. fat.	Average per cent. solids not fat.	Average per cent. total solids.	Weekly lb. fat.	lb. Butter in two days.	Ration.
Lot I.							
May 11—17	1	3.16	8.34	11.50	6.71	....	Preparatory.
" 11—17	2	3 26	8.77	12.03	7.17	....	Ration No. 3.
" 18—24	1	3.30	8.41	11.71	6.96	....	
" 18—24	2	3.25	....	....	7.23	....	
" 25—31	1	3.19	9.42	12.61	6.54	3.5	
" 25—31	2	3.02	7.87	10.89	6.71		
June 1—7	1	3.20	8.15	11.35	5.89	4.25	
" 1—7	2	3.30	7.53	10.83	6.65		
Average for 3 weeks	.....	3.22	8.18	11.12	13.32	....	Preparatory.
Lot II.							
April 13—19	3	3.31	8.33	11.64	7.53	....	Ration No. 3.
" 13—19	4	3.21	9.18	12.39	7.74	....	
" 20—26	3	2.90	8.14	11.04	6.64	3.62	
" 20—26	4	3.06	8.53	11.59	8.72		
" 27—May 3	3	3.37	8.60	11.97	7 72	3.75	
" 27— " 3	4	3.34	8.84	12.58	8.88		
May 4—10	3	3.46	9.33	12.79	6.73	....	
" 4—10	4	3.75	7.61	11.36	7.82	....	
Average for 3 weeks	.....	3.31	8.51	11.82	15.40	....	
Lot III.							
March 9—15	5	3.87	....	....	7.35	....	Winter.
" 9—15	6	3.28	....	....	6.86	....	
" 16—22	5	3.46	8.93	12.39	6.54	....	Preparatory.
" 16—22	6	3.16	8.38	11.54	6.86	....	
" 23—29	5	3.51	9.59	13.10	7.56	3.94	Ration No. 3.
" 23—29	6	3.02	8.80	11.82	7.20		
" 30—April 5	5	3.23	5.73	8.96	7.12	....	
" 30— " 5	6	3.16	8.54	11.70	7.42	....	
April 6—12	5	3.46	9.16	12.62	7.20	3.72	
" 6—12	6	2.93	8.63	11.56	6.56		
Average for 3 weeks	.....	3.22	8.41	11.63	14.36		

Lot I. This lot on the winter ration gave an average per cent. of fat of 3.88, and on the oil meal and hay ration (No. 2) an average of 3.52. The per cent. of solids not fat was 8.67 (fed No. 2) as compared with 7.76 on No. 1, and 8.18 on No. 3. The total pounds of fat in one week were 14.33 (average of 21 days) as compared with 10.70 on No. 1, and 13.32 on No. 3. A DECREASE IN PER CENT. OF FAT, AN INCREASE IN TOTAL POUNDS OF FAT PRODUCED.

Lot II. Average per cent. of fat for period in which No. 2 ration was fed, was 3.47 as compared with 3.93, 3.99 and 3.31 in other periods. Solids not fat were 12.13 on this, and 11.67 and 11.82 on the poor ration and the pea, oat and cornmeal ration respectively. A DECREASE IN PER CENT. OF FAT.

Lot III. Average per cent. of fat on ration 2 was 3.49; solids not fat 8.54; pounds fat 12.50. In both fat per cent. and solids not fat there was a slight change—

more in the latter. When the different lots are compared with each other on ration No. 3 there is not much difference in the average per cent. of fat nor in the solids not fat, and when compared with their record on the other rations it may be said that there appears to be wider variations in the solids not fat than in the per cent. of fat itself, *while the latter (per cent. of fat) for all the lots appears to be slightly lower than when fed on any of the other rations.*

THE AVERAGE PER CENT. OF FAT PRODUCED BY THE THREE LOTS ON RATION NO. 1, WAS 3.67, ON NO. 2, 3.49, ON NO. 3, 3.25.

CONCLUSIONS.

1. Lot I decreased in per cent. of fat when changed to the poor ration, while the other lots gave richer milk, and the average of all the lots in regard to per cent. of fat in the milk was *greatest on No. 1;* No. 2 next and No. 3 last. The extreme variation, however, is so small, *0.42 of one per cent.* (it being conceded that the Babcock test may vary 0.25 of one per cent.), we may say that so far as these experiments show there was no appreciable difference in the *per cent. of fat* given by the different lots whether fed on poor or rich rations, but there was a marked difference in the total fat or butter yielded due almost altogether to the *quantity of milk* given.

2. The *average per cent. of solids not fat* from all the lots when fed on ration 1 was 7.79; on No. 2, 8.62; on No. 3, 8.37. The extreme variation is but 0.83 of one per cent. from the different rations, hence we may conclude *that these also remain quite constant.*

EFFECT OF FOOD ON QUANTITY OF MILK.

Ration No. 1.

DATE.	No. cow.	Average lb. milk per day.	Average lb. milk per week.	Average wt. cows.	Average temp. stable.	Ration.
Lot I.						
March 9–15	1	28.0	202.0			Winter.
“ 9–15	2	29.9	209.5			“
“ 16–22	1	26.0	182.0	1078		Preparatory.
“ 16–22	2	28.5	199.0	908		“
“ 28–April 12	1	21.6	151.3	994	51.6°	No. 1.
“ 23– “ 12	2	22.2	156.0	891		
Average 7 days		58	412	1986		Winter.
“ 21 “		44	308	1885		No. 1.
Lot II.						
May 11–17	3	27.8	194.4	1078		Preparatory
“ 11–17	4	32.0	223.9	*989		“
“ 18–June 7	3	21.6	151.3	1023	65°	No. 1.
“ 18– “ 7	4	22.4	158.3	947		
Average 7 days		63	442	2067		Winter.
“ 21 “		44	310	1970		No. 1.
Lot III.						
April 13–19	5	26.1	183	1213		Preparatory.
“ 13–19	6	27.7	193	1142		“
“ 20–May 10	5	21.3	149.2	1140	60°	No. 1.
“ 20– “ 10	6	21.6	154.8	1089		
Average 7 days		57	399	2355		Winter.
“ 21 “		43	304	2229		No. 1.

*The weights given are those at the close of each period.

In every case when ration No. 1 was fed there was a decided falling off in the quantity of milk given by the different lots. Cows 1 and 2 decreased from 202 and 209 lb. respectively on the winter ration to 151 and 156 lb. as the average weekly yield for twenty-one days when fed on the ensilage and straw ration.

Cows 3 and 4 decreased in their weekly yield from 223 and 226 lb. respectively, being the average weekly yield for twenty-one days when fed on the pea, oat and cornmeal ration to 151 and 158 lb. when changed to ration 1.

Cows 5 and 6 decreased in their weekly yield from 214 and 232 lb. respectively, being the average weekly yield for twenty-one days when fed on ration 3 to 149 and 154 lb respectively when changed to ration 1.

Here we have *an average loss of 104 lb. milk per week* from *Lot I, 180 lb. per week for Lot II, and 143 lb. for Lot III* when fed ensilage and straw, and in the case of Lots II and III in addition they received 10 lb. hay per day, so that, so far as quantity of milk is concerned, it would seem that this ration is not sufficient to keep up a good flow of milk. Whether it was profitable to allow this decrease or not we shall discuss farther on. The average weekly yield from all the cows on this ration was 921 lb. as against 1,252 lb. on what may be termed the standard winter ration.

Ration No. 2.

DATE.	No. cow.	Average lb. milk per day.	Average lb. milk per week.	Wt. cows.	Average temp. stable.	Ration.
Lot I.						
April 13–19	1	23.0	161.0	1033	60°	Preparatory.
" 13–19	2	23.4	163.5	926		
" 20–May 10	1	27.8	194.8	1060	......	No. 2.
" 20– " 10	2	29.7	203.1	957	......	"
Average 21 days	......	57	398	2017	......	No. 2.
Lot II.						
March 9–15	3	33.5	234.5	......	......	Winter.
" 9–15	4	29.6	207.5	......	......	"
" 16–22	3	33.6	255.0	1130	51.6°	Preparatory
" 16–22	4	31.6	221.5	1033		
" 23–April 12	3	33.4	233.8	1145	......	No. 2.
" 23– " 12	4	34.2	239.3	1093	......	"
Average 21 days	......	68	473	2238	......	No. 2.
Lot III.						
May 11–17	5	22.5	157.4	1173	65°	Preparatory
" 11–17	6	22.5	157.4	1152		
" 18–June 7	5	25.1	177.8	1159	......	No. 2.
" 18– " 7	6	25.6	178.5	1132		"
Average 21 days	......	51	356	2291	......	No. 2.

Lot I when changed from ration 1 to ration 2 increased their average weekly yield of 151 and 156 lb. to 194 and 203 lb., but did not in twenty-one days quite attain to their weekly average on the winter ration, but allowing for influence of "period of lactation" we may say that on the richer ration they recovered their normal milk yield.

Lot II on the winter ration yielded a weekly average of 234 and 207 lb. milk and the weekly average of the two cows on ration 2 for twenty-one days was 233 and 239 lb. No gain in the case of one cow and a gain of 32 lb. in the other. *It would appear that No. 3 had attained the maximum yield on the winter ration and could not be made to produce more when the richer ration was substituted.* With No. 4 it was otherwise as the figures show.

Lot III, which had been fed on the poor ration (No. 1) previous to being fed No. 2, increased from 149 and 154 lb. to 177 and 178 lb. on the oil meal ration, but did not reach their yield of 190 and 209 lb. on winter feed, nor their 214 and 232 on the pea, oat and cornmeal rations.

The average weekly yield from all the cows on this ration was 1,227 lb.

Ration No. 3.

DATE.	No. cow.	Average lb. milk per day.	Average lb. milk per week.	Average wt. cows.	Average temp. stable.	Ration.
Lot I.						
May 11—17	1	30.4	212.5	1069	658	Preparatory.
" 11—17	2	31.4	219.9	961		
" 18—June 7	1	28.7	201.3	1018	....	No. 3.
" 18— " 7	2	30.7	215.4	870	....	"
Average 21 days	....	59	417	1888	....	No. 3.
Lot II.						
April 13—19	3	32.5	227.5	1163	60°	Preparatory.
" 13—19	4	34.4	241.0	1062		
" 20—May 10	3	31.8	223.0	1177	....	No. 3.
" 20— " 10	4	36.8	266.8	1077	....	"
Average 21 days	....	68	490	2254	....	No. 3.
Lot III.						
March 9—15	5	27.1	190	....	....	Winter.
" 9—15	6	29.9	209	....	....	"
" 16—22	5	27.0	189	1260	51°.6	Preparatory.
" 16—22	6	31.0	217	1195		
" 23—April 12	5	30.6	214.6	1283	....	No. 3.
" 23— " 12	6	33.2	232.5	1232	....	"
Average 21 days	....	64	447	2515	....	No. 3.

Lot I on this ration gave an average weekly yield of 201 and 215 lb. Lot II, 223 and 266 lb. and Lot III 214 and 232 lb. The average weekly yield from all the cows on this ration was 1,353 lb.

To see the influence of the different rations on the quantity of milk with the six cows, the following table may present the results more forcibly :

Ration.	Average lb. milk per week.	Cost per 100 lb.
		$ c.
*Winter (ensilage, bran and hay) N. R. 1:84	1252	0 42½
No. 1 (ensilage, oat straw and hay) N. R. 1:25.6	921	....
" 2 (hay and oil meals) N. R. 1:3.9	1227	0 82
" 3 (hay, pea, oat and corn meals) N. R. 1:6.8	1353	1 02

*Lot I received ensilage and straw only during first period, but it was found necessary to add something more in the next two periods, so 10 lb. hay was added.

CONCLUSIONS.

1. Feed has a marked influence on the *quantity* of milk.

2. When cost of food is taken into consideration we find a great difference in the cost of producing 100 pounds of milk and hence we should use those foods which give a good flow of milk at a comparatively low cost, and of the foods here given when the cost of production was lowest, ensilage formed the chief part of the ration.

3. The dry rations, though they contained much more digestible nutrients, did not increase the milk yield to any great extent. Succulent fodders containing sufficient nutrients appear to be better suited for a good milk flow.

The food and the cow determine the quantity of milk, the cow governs the quality.

SOURCE OF BUTTER FAT IN MILK.

Table showing the pounds of digestible albuminoids and fat fed in seven days and the pounds of fat recovered in the milk during the last seven days of each period.

Ration.	lb. alb'ds.	lb. fat.	lb. fat in milk.	+ Gain or —loss of fat in milk, lb.	Wt. cows during period.		+ Gain or —loss.	Lots.
					lb. beginning.	lb. end.		
German Standard	35.0	5.60	....	....	....	....	... .	.....
No. 1..........	*4.48	4.06	9.24	+5.18	1986	1886	—100	I.
" 1...	8.68	5.74	9.93	+4.19	2254	1970	—284	II.
" 1........	8.68	5.74	10.02	+4.28	2516	2230	—286	III.
Averages	7.28	5.18	9.40	+4.55	2252	2028	—224	... .
No. 2..............	47.04	14.00	14.55	+0.55	1886	2018	+132	I.
" 2...	47.04	14.00	15.85	+1.85	2164	2238	+ 71	II.
" 2......	47.04	14.00	10.62	—3.38	2230	2292	+ 62	III.
Averages	47.04	14.00	13.67	—0.98	2094	2182	+ 88	..... .
No. 3.....................	38.92	14.70	12.54	—2.16	2018	1888	—130	I.
" 3.....................	38.92	14.70	14.55	—0.15	2238	2244	+ 16	II.
" 3.......	38.92	14.70	13.76	—0.94	2456	2516	+ 60	III.
Averages	38.92	14.70	13.62	—1.08	2238	2216	— 22	.....
Winter..	17.08	6.16	15.93	+9.77	....	....	....	I.
"	17.08	6.16	17.69	+11.53	....	....	....	II.
"	17.08	6.16	14.21	+8.05	....	....	....	III.
Averages	17.08	6.16	15.94	+9.78	....	....	.. ..	......

*This lot received ensilage and straw only for the first period. For the other lots hay was added.

WAS THE FAT FED IN THE FOOD RECOVERED IN THE MILK?

In the case of Lot I it will be noticed by referring to the preceding table that they produced 9.24 lb. of fat in their milk during the last seven days of Period I. For the same length of time they were fed 4.06 lb. digestible fat in their ration. Here evidently there was not sufficient fat in their food to supply the fat of the milk. During the same time they were fed 4.48 lb. digestible albuminoids and 154.98 lbs. of digestible carbhydrates. According to the German standard an animal of 1,000 lbs. weight would require for maintenance 9.8 lb. digestibie albuminoids, 112 lb. carbhydrates and 2.10 lb. fat. If this be true then we should have to add to this ration 5.32 lb. albuminoids to make it a maintenance ration. To make up for this lack and to provide the constituents of the milk produced at the same time, we have 42.98 lb. carbhydrates and 1.96 lb. fat in the ration, together with a loss of 100 lb. in weight during 28 days, an average of 3.6 lbs per day, or 25.2 lbs. during the seven days, or in other words, 42.98 lb. carbohydrates +1.96 lb. fat +25.2 lb. of weight in animals produced 9.24 lb. fat and 21.99 lb. casein and sugar in the milk.

It will be noticed that Lots II and III produced about the same amount of fat in the milk and lost much more in the flesh—nearly three times as much as did Lot I—while they received much more fat and albuminoids in their ration. This difference no doubt is largely accounted for in the influence of the previous rations, which were so much richer that when the change was made to the poor ration the cows did not respond so readily.

When the oil meal ration was fed each lot received 14.00 lb. of digestible fat per week, and 47.04 lb. of digestible albuminoids, while the average of all the lots was 13.67 lb. fat in the milk and an average increase in weight of 22.4 lb. on each lot. To state it otherwise, each lot received above the amount required for maintenance, 37.24 lb. albuminoids, 33.60 lb. carbhydrates and 11.90 lb. fat, which produced 13.67 lb. fat in the milk and an average gain of weight on each lot for seven days of 22.4 lb.

On the pea, oat and corn meal ration each lot produced an average of 14 62 lb. fat in the milk during seven days, while they received 14.70 lb. fat and 38.92 lb. albuminoids in their ration. Here we have about the same number of pounds of fat in the milk as from ration 2, though there were .70 lb. more fat fed, than in ration No. 2, but 8.12 lb. less of albuminoids. The lots on an average lost slightly in weight.

The winter ration contained *17.08 lb. albuminoids* and *6.16 lb. fat*, which produced an average weekly yield of *15.94 lb. fat in the milk.* Comparing this with the German standard we find this ration largely deficient in albuminoids and carbhydrates, the fat slighly in excess but not sufficient to make up for the deficiency in carbhydrates.

CONCLUSIONS.

This experiment apppears to warrant the following conclusions:

1. When there is a deficiency of fat or albuminoids in the ration, the animal draws from its own body to make up this lack, maintaining about the same *quality* of milk, though the quantity was greatly reduced. (This would doubtless continue so long as the animal remained in good condition, but when the vitality was reduced to a certain point we might expect a poorer quality of milk, but so long as the cow has the material in her body to spare, so long will she continue to draw from that source to maintain her average quality of milk.)

2. When an excess of nutrients is fed these are doubtless wasted to a considerable extent, and if fed for a length of time might do injury to the animals, though these cows ate their full ration for a period of 21 days without apparent injury.

3. Judging from the returns from the winter ration we may expect to receive profitable returns from a much wider ratio and on less nutrients than the German standard calls for.

4. In answer to the question, Was the fat fed in the food recovered in the milk? these experiments show that on ration No. 1 more fat was recovered in the milk than was fed in the food, and on No's 2 and 3 the returns of fat in milk were about the same as the fat fed, but whether it all came from the fat of the food or not, we are still in the dark.

THE RATIONS IN ECONOMIC MILK PRODUCTION.

The following is the cost of the different rations per day based on the prices as given below. The oats, straw and meals were bought at the prices given, the ensilage, hay and bran are estimated:

Ensilage........	$ 2 50	per ton.	Corn meal......	$26 00	per ton.
Oat straw.......	5 00	"	Pea "	26 00	"
Hay (mixed)....	10 00	"	Oat "	30 00	"
Cotton seed meal.	31 00	"	Bran	14 00	"
Oil cakes	31 00	"			

Ration No, 1, (ensilage and straw)	8¾	c. per day.
" " 1 + 10 lb. hay	13¾	"
" " 2	24	"
" " 3	33	"
" (winter)	12¾	"

During the experiment we were receiving 25 cents per pound for our butter, but as all the milk was not churned, I have estimated its value on the butter-fat basis of 25 cents per pound. A pound of fat will produce more than a pound of butter, so it will be seen that the lots have not been credited to the full extent of their production in butter value.

It will be seen that Lot I, when fed on ensilage and straw at a cost or 17½ cents per day or $1.22 per week produced 9.24 lb. of fat in one week, which, reckoned at 25 cents per pound, would be worth $2.31. Here then was a return of nearly 100 per cent. and the unthinking might say that this ration gave the best results. Not so. The tables show that these animals lost considerably in weight, and had this ration been continued for very long, the result would have been an almost total stoppage of the milk secretion. So long as there were stores in the body these were made use of, but as soon as these had become depleted then would the milk production have been reduced to a minimum.

Even after 10 lb. hay was added to this ration at an increased cost of 10c per day, Lots II and III still lost heavily in weight and produced only about the same value in fat, viz., $2.50 worth, as the average of the last week's production for each lot when fed on ensilage, straw and hay.

Ration No. 2 cost $3.36 per week and the average value of fat produced in one week (last week of each period) by all the lots was $3.42. This ration is too expensive but doubtless if the oil meals had been fed in smaller quantities it would have given an economic production.

Ration No. 3 cost $4.82 for each lot for one week, while the average value of the fat produced was only $3.81. Such a ration as this with these cows was wholly unprofitable, the object of the experiment, however, was more to find out *the effect of food on the quality of milk than to produce milk economically.*

Our winter ration of ensilage, bran and hay, which cost 12¾ cents per day or $1.78 for a lot for one week gave an average fat production in one week with the three lots of 15 94 lb. worth $3.98, at the same time it kept the cows in good condition. While it had the advantage of having been fed early in the period of lactation and did not have to contend with the possible influences of previous rations, yet it may be said that it gave a fair return in butter-fat production—over 100 per cent. more than the cost of the ration.

Conclusions.

1. It is a waste of food to give more than the animal can assimilate. Find the capacity of the animal for economic production and feed to that capacity.

2. A poor ration may give profitable returns for a while but will end in depletion of the cow's vitality and hence injure milk secretion.

3. The cost of food fed is an important item in the profitable returns from a dairy and an extra amount of some cheap food in the ration, such as ensilage or bran may prove a profitable investment. For instance, in the case of Lot I, by putting 20 lb. straw in the place of 6 lb. hay and 5 lb. bran, and reducing the ensilage from 50 lb. to 30 lb. per day, we reduced the cost of the weekly food from $1.78 to $1.22, but we also decreased the value of their production in butter-fat (besides loss of skim milk) from $3.98 to $2.31 ; in other words by reducing the cost of the feed 32 per cent., the value of fat was reduced 42 per cent., besides causing the cows to lose in weight.

4. On such a ration as given to our cows last winter, when 15.94 lb. fat cost $1.78 to produce it, or 11.2c per pound. When butter brings 25c pound there should be profit in winter dairying.

5. All our cows did not make as profitable returns as did these six, hence the importance of having a good cow as well as good and cheap food to feed her.

Effect of Rations on Creaming and Churning.

Lots.		Av. p. c. fat in skim milk.	Av. p. c. fat in buttermilk.
Ration No. 1	I.	0.50	0.74
	II.		0.18
	III.	0.54	0.09
	Average	0.52	0.51
Ration No. 2	I.	0.19	0.09
	II.	0.51	
	III.		0.18
	Average	0.35	0 14
Ration No. 3	I.		0.27
	II.	0.33	0.09
	III.	0.72	
	Average	0.53	0.18

Conclusions.

These experiments, on the whole, appear to give slightly better results in creaming and churning when the ration of oil meals and hay were fed. Other experimenters have also found much better results in creaming where cottonseed meal has been fed; but there is an important factor, besides the effect of the ration fed, which enters into this question, viz., the effect of the individual characteristics of the cow on creaming, in regard to which we have some interesting data relative to our own herd.

Effect of Food on the Composition of Butter.

Having discussed the effect of food on the quality of milk, it will now be in order to see what effect it had upon the composition of the butter produced by the three lots on the rations as given previously.

The plan of obtaining a sample of butter was to set the milk in deep cans. Each lot was set separately on two days of each week, and after skimming, ripening, churning and working the butter under the same conditions as far as possible, a sample of the butter was sent to the chemical laboratory, the last week (third) of each period, where it was analysed under the supervision of Prof. James. Unfortunately, the samples in the third period were lost. The results of the analyses from the 1st, 2nd and 4th periods, together with the rations fed, are as follows:

ANALYSIS OF BUTTER FROM DIFFERENT RATIONS.

Lot	RATIONS.	Melting point.	Iodine number.	Water.	Fat.	Curd.	Salt.	Ash.
	1st. Period.							
I.	Ensilage..... 30 lb .... Oat straw ....20 "	31.75	....	10.66	84.91	2.19	1.51	0.73
II.	Hay..........20 " .... Linseed meal, 4 " .. .. Cottonseed " 5 "	34.62	....	11.44	82.55	3.59	1.55	0.87
III.	Hay..........20 " ... ... Pea meal .... 4 " .... Oat " .... 5 " .... Corn " .... 8 "	33.00	... .	13.63	82.08	1.95	1.43	0.91
	2nd Period.							
I.	Hay and oil meals	34.75	38.4	9.40	87.51	0.80	1.57	0.72
II.	Hay and grain meals	32.00	30.9	12.36	84.92	1.00	1.05	0.68
III.	Ensilage, hay (10 lb.) straw	31.50	37.0	12.05	84.65	1.13	1.66	0.51
	4th Period.							
I.	Pasture	32.3	24.4	13.47	77.42	1.73	4.41	2.97
II.	Hay......... ..30 lb .... Linseed meal.... 9 "	33.0	37.0	11.87	80.16	1.39	3.95	2.63
III.	Hay.......... 30 " .... Cottonseed meal, 9 "	36.5	35.0	11.47	80.54	1.30	3.54	3.15

It will be seen that the fat of the butter varies from 77.42 per cent. on grass to 87.51 per cent. on the hay and oil meals. The water from 10.66 per cent. in the case of Lot I, in the first period to 13.63 per cent. in the butter from Lot III. during the same time.

I think, however, that too much stress ought not to be laid upon differences of composition in the butter due to food influences, as shown by analysis, as the *method of manufacture may have more to do with this than the food.* My reasons for thinking so in this case are, that between the second period here reported and the fourth period the butter-maker was changed, and the butter made in the latter period may not have been handled exactly as in the other cases, although the instructions to the two men were exactly the same. This doubtless accounts for the comparatively high per cent. of salt found in the butters of the fourth period.

While we did not examine the butter as to the per cent. of volatile acids present, the specific gravity, nor the reducing agent which has been found in butters from animals fed on cottonseed meal, the two points which were studied more particularly, and which throw some light on the composition of butter fats found in the butters, were the iodine equivalent and the melting point.

"The *fat* of butter consists of a mixture of the glycerides of the fatty acids—palmitic, stearic and oleic,—not soluble in water; and also of the glycerides of certain soluble and volatile fatty acids, principally butyric, with small quantities of caproic, caprylic and capric acids."

The general composition of butter fat, according to Blyth, is as follows:

Olein	42.21
Stearin and Palmitin	50.00
Butyrin	7.69
Caproin, Caprylin and Rutin.......	.10
	100.00

IODINE EQUIVALENT.

The fats, stearin, palmitin, butyrin, caproin, caprylin and rutin, are glycerides of saturated fatty acids, $C_n H_{2n} O_2$. Olein is a glyceride of an unsaturated fatty acid (oleic), $C_n H_{2n-2} O_2$.

The unsaturated or unsatistied acids and compounds of the oleic series are quite similar in their physical properties to saturated, but they differ in melting point. Besides this difference, they are capable of combining with two atoms of hydrogen or two atoms of a halogen, such as iodine, to satisfy them.

"The iodine number of a fat expresses," according to Hübl, " the number of grammes of iodine absorbed by 100 grammes of the fat" ; and the amount of iodine absorbed depending on the amount of olein (a soft or oily fat) present, when we have determined the iodine number of a butter, we have an indication of the quantity of olein present.

The method followed in these experiments was that recommended in the 1889 report of Official Chemists of United States.

Woll, in "Agricultural Science," Vol. I., No. 4, p. 80, gives for pure butters as the iodine number (average of 25 samples) 30.83, with a variation of 25.7 to 37.9, and an average per cent. of olein of 35.86—considerably lower than that of Blyth, which is 42.21.

In the 1889 reports of chemists already referred to, p. 146, the average iodine number of 7 samples of butter is stated to be 37.61, and of three samples obtained when cottonseed meal had been fed, the average was 35.63. "The melting points of the butters from cows fed on cottonseed meal are markedly higher than from the other samples. There is also a markedly diminished content of volatile acids in these butters and a lower iodine absorption power."

The following table shows the iodine numbers and calculated per cent. of olein, from the different rations in our own experiment :

	2nd Period.			4th Period.		
Lot	Ration.	Iodine No.	Per cent. olein.	Ration.	Iodine No.	Per cent. olein.
I.	Hay and linseed and cottonseed.	38.4	44.6	Pasture	24.4	28.3
II.	Hay and grain meals........	30.9	35.9	Hay and linseed meal	37.0	42.9
III.	Ensilage .... Hay .... Straw......	37.0	42.9	Hay and cottonseed meal....	35.0	40.6

This experiment shows a higher absorption of iodine, when mixed linseed and cotton-seed meals were fed, as compared with other rations, and also when these meals were fed separately, except in the case of Lot III. on cottonseed as compared with ensilage, hay and straw. Taking the per cent. of olein, found when hay and grain meals were fed as the standard, we find that when linseed and hay were fed, the per cent. increased 7 with the same lot of cows ; and when a mixture of the oil meals was fed to another lot an increase of 8.7. When cottonseed alone was fed there was increase of 4.7 per cent. of olein over that obtained from grain butters.

These results appear to accord with those of Ladd (N. Y. station, 1888, p. 291).

MELTING POINT.

The fats of butter have different melting points which distinguish them as hard and soft fats. The harder fats (palmitin and stearin), having a higher melting point and the softer fats (olein) having a lower. A decrease, therefore, of the melting point indicates an increase of olein present in the butter.

According to one authority, "difference in melting points at least partly depend upon the nature of the pasture grass." "Ensilage, grass and hay produce butters with the highest melting points; then follow beets, while exclusive green food, whether in pasture or in stall, and whether from grass or clover, gives butters with the lowest melting point.'

Blyth gives the melting point of various fats as follows:—

Butterine	31.3° C.	Mixed	42.6° C.
Cocoa Butter	34 9° C.	Lard, from	42° C. to 45° C.
Butter (average)	35.8° C.	Ox fat	48° C. to 53° C.
Beef dripping	43.8° C.	Mutton fat	50° C. to 51.6° C.
Veal dripping	47.7° C.	Tallow	53.3 C.

"It hence follows that a low melting point indicates the probable presence of butterine, . . . A higher melting point indicates, as a probable adulterant, dripping, lard, or other animal fat."

In all experiments with feeding cottonseed meal it has been found to give butter with a comparatively high melting point. The average melting point of 8 samples of butter, where no cottonseed had been fed, as given in Report of Agricultural Chemists, '89 is 35.02° C., and of three samples where cottonseed had been fed it was 38.56° C.—an increase of 3.54 degrees.

The practical importance of the melting point lies in the fact that butter may be adulterated with animal fats, and the melting point is an indication of this, as all these fats have a high melting point. They are not so valuable as the softer olein. Too great a preponderance of olein, however, makes the butter soft and oily, rendering it less fit for shipping. This point is of more significance in the south than in our climate. Summer butter contains more olein or soft fat than does winter butter, hence a reason for its tendency to be soft. It will also be of some importance in the production of Canadian butter for export, especially if the butter should be shipped through warm countries, or be exported for use in countries of higher temperature than Ontario.

Our experiment also showed a high melting point (36.5), when cottonseed was fed, but not so high as in the cases previously cited. When linseed meal alone was fed the melting point was 33.0, and when a mixture of these two were fed it was 34.69,—just about the average of linseed and cottonseed. Pasture gave a butter with a slightly higher melting point than the corn ensilage, hay and straw ration and about the same as that produced by hay and grain meals.

Taking the average melting point (32.4) of the butters produced from the ensilage, hay, straw and grass rations as a standard, we find that it was increased 2.3° C. when a mixture of oil meals and hay was fed; 1° when linseed alone was fed; and 4.1° on the cottonseed ration.

CONCLUSIONS.

1. As indicated by the iodine number the butters from cottonseed and linseed rations contained a high per cent. of olein. (In the case of the linseed, it may be partially accounted for by the high iodine number of linseed oil, 155).

2. Butters from the cotton-seed ration has a higher melting point than that obtained from any of the other rations used in the experiment.

3. So far as we could tell from a practical examination of the butters produced by the different rations. There did not appear to be much, if any, difference in them as to their merchantable value, especially for local markets.

4. That the per cent. of fat, water and other foreign substance found in butter, is more likely due to the method of manufacture than to the influence of food.

COTTON-SEED AND LINSEED MEAL RATIONS FOR MILK.

In our previous experiment we found that when the cows were fed on a mixture of linseed and cottonseed meal, the melting point of the butter was not so high as was observed by other experimenters when a ration of cottonseed alone was fed. At the suggestion of Prof. James, of the chemical department, we decided to further continue the experiment, the chief aim of which was to determine the effect of linseed meal and cottonseed meal, when fed separately, on the melting point of butter ; while at the same time we continued our work in regard to the effect of these rations on the quality of milk, the quantity of milk, the amount of fat recovered in the milk and their effect on creaming and churning.

For this purpose the same six cows were used in the previous experiment.

The conditions were : Lot I was turned out to pasture. Lot II was fed daily 30 lb hay and 9 lb. linseed meal. Lot III was fed daily 30 lb. hay and 9 lb. cottonseed meal.

The average temperature of the stable was 74°F. The experiment continued from June 7th to June 28th. Fat determinations were made with Babcock test.

This table shows pounds of digestible matter in rations fed.

Rations.	Albuminoids.	Carbhydrates.	Fat.	Cost per day.	Nutritive ratio.
German standard for milch cows.	2.5	12.5	0.40	cts.	1:5.4
(4) Timothy hay, 30 lb	0.48	6.17	0.19		
Cotton seed meal, 9 lb......	2.93	2.34	0.90	29	1:3.3
Total pounds fed............	3.41	8.51	1.09		
(5) Timothy hay, 30 lb	0.48	6.17	0.19		
Linseed meal, 9 "	2.56	3 24	0.63	29	1:3.7
Total pounds fed............	3.04	9.41	0.82		
(6) Pasture grass, 100 lb*.......	2.25	14.72	0.53	5	1:7.1

*Estimated

Comparison of the qualities of milk from different rations.

Date.	Lot.	Av. p. c. fat.	Av. p. c. solids, not fat.	Av. p. c., total solids.	Weekly lbs. fat.	lb. butter in two days.	Ration.
May 18 to June 7.......	I.	3.22	8.18	11.12	13.32	3.68	No. 3 (pease, oat and corn.)
June 14-28	II.	3.95	8.17	12.12	16.61	3.25	Grass in pasture.
May 18 to June 7.......	I.	3.99	7.69	11.67	12.46	3.25	No. 1 (ensilage, hay & straw.)
June 14-28.	.	3.84	7.96	11.80	12.62	3.50	No. 5 (hay and linseed.)
May 18 to June 7........	III.	3.49	8.54	12.01	12.50	3.38	No. 2 (hay and linseed & cottonseed meal.
June 14 to 28............	III.	3.55	8.46	12.01	12.51	3.50	No. 4 (hay and cottonseed.
April 20 to May 10	IV.	3.53	7.92	11.45	10.58	2.70	No. 1 (ensilage hay and straw.
March 22 to April 12 . .	IV.	3.22	......	......	......	....	Pease, oat and corn.
Week ending March 15....	IV.	3 58	....	....	... .	....	Winter (ensilage, hay & bran

It will be observed that when Lot I, was turned out to pasture the average per cent. of fat increased 0.73 of one per cent. as the average of the last two weeks of this period, when compared with the previous period. (Lot II was turned out on June 28th at the close of the period, and no such increase was observed—in fact there was a slight decrease in fat per cent.)

Lot II on the hay and linseed meal decreased slightly in percentage of fat from their average on No. 1 ration, while Lot III on hay and cottonseed, continued to produce milk of about the same quality, as in the previous period, and it is interesting to note that this lot having now been fed for seven weeks on oil meals, is producing milk of about the same composition as when receiving ration 1, or on their winter ration.

The per cent. of solids, not fat, remained about the same as in the previous periods. In the case of Lot II, there was an increase of 0.25 of one per cent.

It may be interesting at this stage to compare the average per cent. of fat as given on the ordinary winter ration, for the week ending March 15th, with the average per cent. of fat found for the week ending June 28th.

	Per cent. fat.	Ration.
Lot I, March 15th	3.88	Hay, ensilage and bran
June 28th	4.05	Pasture
Lot II, March 15th	4.02	Hay, ensilage and bran
June 28th	3.73	Hay and linseed meal
Lot III, March 15th	3.58	Hay, ensilage and bran
June 28th	3.35	Hay and cottonseed meal

CONCLUSIONS.

1. Lot I, when turned out to grass increased in per cent. of fat, but as this was not observed in the others, we are inclined to think it was not altogether the food that caused the increase, but possibly some peculiarity of the animals, or influences other than the food.

2 Lots II and III, continued to yield about their normal quality of milk, though, as will be seen by referring to table, they were receiving a ration very rich in albuminoids and fat, and neither of these appeared to affect to any great extent the quality of milk given.

3. The general conclusion would seem to be, that *the food does not affect the quality of milk to any appreciable extent so long as the animals are in good condition.* This applies more particularly to rations fed for short periods—from 21 to 28 days—but in case of Lot III, it may be said to be true for 49 days.

The following table shows the effect of rations on quantity of milk.

Date.	Lot.	Daily average lb. of milk.	Weekly average lb. milk.	Ration.
June 14-28	I	30.0	210 0	Grass in pasture
May 18, June 7	I	29.0	203.0	No. 3 (peas, oats and corn)
June 14-28	II	23.4	163.8	No. 5 (hay and linseed)
May 18 to June 7	II	22.0	144.0	No. 1 (ensilage, hay and straw
May 14 to June 12.	III	25.2	176.1	No. 4 (hay and cottonseed)
May 18 to June 7	III	25.0	175.0	No. 2 (hay and oil meals)

Lot I, when turned to grass increased their weekly yield of milk from 203 on ration 3 to 210 pounds on grass. Lot II increased from 144 lb. to 163 lb. and Lot III continued to give practically the same amount of milk on the timothy hay and cotton seed as they did on the mixed hay and oil meals.

CONCLUSIONS.

In this experiment as in the other, the succulent food (grass) gave a larger flow of milk than did the more concentrated ration of pea, oat and corn meals, together with hay; and the other cows which were kept inside and fed on very rich oil meal rations, did not give the flow of milk that the cows on grass produced. *Succulent food gave best results in milk flow.*

The next table shows amount of digestible fat fed and fat produced in milk during last seven days of the experiment.

Ration.	Lot.	lb. alb'ds.	lb. carb.	lb. fat.	lb. fat in milk.	Gain and loss, lb. fat in milk.	Weight cows during period		lb. gain or loss.
							lb. beginning.	lb. end.	
German standard........	...	35.0	12.5	....	....	....	....	....	....
No. 4....	III	47.7	119.1	11.7	11.7	-5.6	2,332	2,268	-64
No. 5	II	42.6	131.7	12.3	12.3	+0.2	2,038	1,934	-104
No. 6 (Grass)..	I	31.5	206.1	7.4	17.4	+10.0	1,910	1,966	+56

On the basis of 100 lb. of grass, as the amount a cow would eat in one day when in good pasture, we find that lot I, taking the average composition of grass as given by Armsby, would consume about 7.4 lb. of digestible fat in one week, and during the last week of this period they produced 17.4 lb. of fat in their milk which seems to indicate that *the fat of the milk is made from something other than the fat in the food eaten.* There is an excess of 10 lb. of fat produced in the milk over that furnished in the food for the same period.

Lots II and III, were fed an excess of digestible fat and albuminoids over that produced in the milk, and at the same time they appear to have lost in weight.

CONCLUSIONS.

1. These cows (Lots II and III), could not make use of such a rich ration, and to such it would be useless to feed such large quantities of oil meals.

2. An excess of fat and albuminoids did not give a corresponding increase in milk flow, or in milk solids.

3. In the case of lot I, the fat of the milk was evidently obtained from something other than the fat of the food.

Effect on creaming and churning.

Lots.	Av. per cent. fat in skim milk.	Av. per cent. fat in buttermilk.
I	0.30	0.2
II	0.40	0.1
III	0.45	0.5

All these were creamed and churned under the same conditions as far as possible, but as the milk from each lot had been set on two days only of the last week in the period, and only one churning from each lot had been made, no very definite conclusions can be arrived at; however, as they stand there does not appear to be a great deal of difference in the creaming.

Cost of Producing Butter Fat on these Rations.

With butter fat worth 25c per pound, we find that lot III, on ration 4 (hay and cottonseed), produced $2.93 worth in one week, but this ration cost $4.06. To feed this to these cows would be a loss. Lot II, on ration 5 (hay and linseed), produced $3.38 butter fat at the same cost as the preceding, viz., $4.06. Lot I, on grass, produced 17.4 lb. fat, worth $4.35, which cost, on an estimate of 5c per day, or $1.50 per month for pasture, *seventy cents* to produce it.

Here again the value of succulent food comes in as a cheap producer of milk.

Conclusions.

At the prices given and to such cows as were used in this experiment, a ration of hay (30 lb.) and cotton-seed meal (9 lb.) would not pay The same may be said of the other ration (hay and linseed), while grass or pasture at the price given proves a cheap milk producer.

RECORD OF OUR DAIRY HERD.

When I took charge of the Dairy Department there were in the herd nine grade cows, most of which were milking at the time. By order of the Minister of Agriculture, the representatives of the dairy breeds, which had formerly been in charge of the farm department, were removed to the dairy on 3rd of April. The animals transferred consisted of two Ayrshires, their calves, two Holsteins, and one Jersey, making five cows in all. Two of the grade cows were sold for beef early in the season, one of them proving not to be in calf and the other having a poor record as a milker. One grade cow was bought, so that the herd at present consists of thirteen cows (five registered animals and eight grade cows) and four calves (three thoroughbreds and one grade).

We should have representatives of all the leading dairy breeds for purposes of instruction. It is unnecessary to add that these should be the best representatives of the breed that can be obtained, because so many persons visit our institution, in addition to students, and many of these are apt to form their judgment regarding the merits of the different breeds from the performance of these breeds at the Experimental Farm.

The amount of milk given in a year by the average cow in the country has been estimated at about 3,000 pounds. If this be a correct estimate and if there be many "average cows" kept by farmers, it means a loss, or at least very little profit, on all such. Where no systematic record is kept it is not known which cows are profitable and which are not. That it may possibly be of some service to dairymen who wish to keep a record of their cows we herewith give the method used in our experimental dairy together with the record of our cows as far as possible for the year.

Each cow's milk is weighed morning and evening, and the weight recorded on ruled sheets tacked in a convenient place, of which the following is a sample containing the record of four cows for one week :

Date.	No. 13.		No. 7.		No. 10.		No. 12.	
	Morning.	Evening.	Morning.	Evening.	Morning.	Evening.	Morning.	Evening.
	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.
June 29th	25	20	14	10	30	20	10	9
" 30th	20	23	13	10	25	20	7	8
July 1st.........	20	19	14	10	23	26	7	[illegible]
" 2nd........	27	22	12	11	27	22	9	9
" 3rd........	28	17	14	11	28	19	9	6
" 4th........	30	18	14	11	29	18	10	6
" 5th........	26	25	14	12	28	27	10	6
Total for week.	170	144	95	75	190	151	62	52

On Monday night and Tuesday morning of each week a sample is taken from each cow for fat determination by the Babcock method. (Six of the cows have been tested four days of each week since March 18, 1891). We thus have a pretty accurate measure of the value of each cow for butter making besides the quantity of milk she gives. At the end of each week the several records are copied into a convenient sized book, the pages of which are ruled, with headings as follows :

Weekly Record of No. 13.

Week ending	A. M.		P. M.		Total lb. milk.	Average per cent. fat.	Total lb. fat.	Pounds milk to make one lb. fat.	Remarks.
	lb. milk.	Per cent. fat.	lb. milk.	Per cent. fat.					
July 5th..	176	4.5	144	3.8	320	4.15	13.39	23.9	Weight, 1,176 lb. Calved April 31, 1891. Bred to Holstein bull June 22, 1891.

Record of Dairy Cows from January 1 to December 13, 1891.

Cows.	Weight.	Calved.	Bred.	No. days milking.	Total lb. milk	Per cent. fat for year.			Total lb. butter fat.	Lb. milk to make lb. fat.
						Highest.	Lowest.	Average.		
	lb.									
No. 1 (1)	1,078	Jan. 7, 1891 ..	June 29, 1891	340	8,798	4.80	3.16	3.73	328.2	26.8
" 2 (1)	908	" 13, " ..	Oct. 13, "	334	9,028	4.97	2.92	3.86	348.5	25.9
" 3 (1)	1,130	Feb. 6, " ..	Aug. 23, "	310	7,107	4.45	2.90	3.61	256.6	27.7
" 4 (2)	1,260	" 13, " ..	Apr. 14, "	303	7,052	4.65	3.06	3.75	264.5	26.7
" 5 (2)	1,195	Jan. 15, " ..	Sept. 9, "	332	6,711	4.16	3.21	3.66	245.6	27.3
" 6 (1)	1,033	" 29, " ..	Aug. 3, "	318	7,705	3.81	2.90	3.42	263.5	29.2
" 7 * (1)....	825	Mar. 5, " .	July 8, "	221	5,021	4.50	2.95	3.85	193.3	26.0
" 8 * (2)...........	896	Jan. 6, " ..	Feb. 10, "	298	3,039	4.52	2.90	3.77	114.6	26.5
" 9 † (1)........ ..	830	Apr. 13, " ..	Aug. 13, "	244	6,127	4.85	3.10	3.78	231.6	26.5
" 10 (1)	1,232	May 26, " ..	" 16, "	201	8,072	3.40	2.20	2.88	234.5	34.2
" 11 * (1)...........	888	(Oct. 2, 1890) Oct. 25, 1891	June 22, "	388	5,051	5.60	2.20	3.49	176.8	28.7
" 12 * (2).....	858	Feb. 7, " ..	" 26, "	309	3,313	10.00	5.00	5.88	194.8	16.1
" 13 (1)	1,176	Apr. 30, " ..	" 22, "	227	8,159	4.35	3.05	3.86	314.9	25.9
" 14	1,100	Dec. 1, 1890..	Sold for beef..	189	3,404	......	......	......	.....	.....
" 15	1,175	....	" " ..	158	1,830	....	.....	.. .	....	......

(1) Still milking, December 13.

(2) Dry, December 13.

* No record of milk yield previous to April 3rd, 1891.

† " " " May 6th, 1891.

None of our cows, except those on experiment for a time, received more than ordinary rations. The winter ration consisted of : Ensilage, 50 lb. ; hay, 6 lb. ; bran, 5 lb. Summer ration : Pasture ; green feed when pastures became scarce ; bran, 2½ lb.

The records of Nos. 7, 8, 9, 11 and 12 are incomplete, as they were not under our charge until some time after calving. The per cent. of fat and total pounds of milk and fat are those only since a record was kept and in the case of the cows previously referred to it does not do them justice.

The "highest" and "lowest" per cents. of fat are the variations in the average per cent. of either two or eight single tests in one week compared with the same number of tests of another week.

The variation in the weekly average per cent. of fat found in the different cows' milk for the year is from 2.88 (No. 10) to 5.88 (No. 12). The greatest variation in one cow's milk is that of No. 12—10 per cent. just before drying up and 5 per cent. for the week ending July 5th. The average per cent. of fat for the whole herd for the year is 3.81. The lowest single test under ordinary conditions was 2.0 per cent. The highest single test was 11 per cent. of fat. The average pounds of milk given by seven grade cows and one pure bred since January 1, 1891, is 7,826 lb. Two of these (Nos. 10 and 13) are still giving a good flow of milk, having been dry during the early part of the year. The average pounds of *butter-fat* produced by each of seven grade cows, whose records we have complete, is 288.8 lb.—equal to about 320 lb. of marketable butter. Not a large yield by any means.

When we compare the records of the different cows in persistency of milk flow, in spite of advance in period of lactation, there is considerable difference in them. For example, the record of No. 13 shows that she gave 320 lb. milk for the week ending July 5th; seven months afterwards (week ending November 8th) her weekly record was 231 lb.—a decrease of 89 lb. For the same weeks No. 10 gave 341 and 246 lb. respectively—a decrease of 95 lb. in the weekly yield after seven months; while No. 9 on the same food and with the same care gave 198 lb. for week ending July 5th, and 186 lb. during the week ending November 8th—a decrease of only 12 lb. This cow continues to keep up her milk flow remarkably well.

Effect of Period of Lactation on per cent. of Fat.

Six cows, each of which has been tested for an average of 274 days, showed percentages of fat during three periods of their milking as follows:

Cow.	1st period (91 days). per cent. fat.	2nd period (91 days). per cent. fat.	3rd period (91 days). per cent. fat.
No. 1	3.53	3.84	4.29
" 2	3.34	3.88	4.35
" 3	3.49	3.29	4.01
" 4	3.65	3.74	3.88
" 5	3.67	3.75	3.58
" 6	3.25	3.43	3.58
Average six cows	3.49	3.66	3.95

Each cow had been milking an average of 50 days before tests were commenced, yet we do not find such an increased percentage of fat in these cows as is generally accredited to the influence of the "period of lactation"—an increase of only .17 per cent. in the second period and 0.46 in the third over that of the first period.

The average per cent. of fat for the six cows during the first week in which samples were taken (50 days after calving) was 3.83, and that of the last week was 4.08—an average increase of but 0.25 of one per cent. All six are either dry or nearly so. One cow (No. 5) gave milk with less fat in it the last week of her milking than she did the first week of the tests.

DIFFERENCES IN CREAMING DUE TO PECULIARITIES IN THE INDIVIDUAL COWS OF OUR HERD.

Desiring to find what effect the individual characteristics of a cow have on the effectual creaming of her milk, we made the following tests. Each cow's milk was set separately under the conditions given in the tables, the aim being to have each under the same conditions as far a possible.

The herd consisted of thirteen cows, twelve of which were milking at the time, representing three of the distinct breeds, and the rest were ordinary grade cows. By these tests we learned the peculiarities of each cow in regard to creaming, and what is more important, we learned to use greater care when conducting *creaming experiments, to eliminate as far as possible the causes for effects which belong to the milk rather than to the methods, temperature*, etc., of setting. This is a point that has been overlooked by a great many when giving the results of certain methods and temperatures in setting.

The following table shows the per cent. of fat in whole milk and variations in the fat left in the skim milk, from individual cows, when set for 12 hours in submerged creamer cans.

Date.	No. cow.	Whole milk.				Skim milk.		
		Total lb. milk set.	Average temp. when set.	Average per cent. fat.	Total lb. fat.	Average per cent. fat.	Total fat lost.	Temperature when skimmed.
			deg.					deg.
Aug. 2-4, (average 5 trials)	1	65	90	3.80	2.47	0.70	0.38	45
" "	2	59	89	3.70	2.18	0.45	0.21	45
" "	3	56	89	3.60	2.02	0.92	0.44	45
" "	4	62	91	3.58	2 22	0.42	0.25	45
July 29-30, (average 4 trials	5	32	90	3.80	1.22	0.62	0.16	44
July 28-31, (average 6 trials)....	6	65	93	3.00	1.95	0.78	0.20	43
July 26-29, (average 7 trials)....	7	79	91	3.70	2.92	0.97	0.65	44
July 21-23, (average 5 trials) ..	8	37.25	88	3.68	1.37	2.26	0.74	45
July 27-29, "	9	78	95	3.70	2.89	0.24	0.15	44
July 21-23, " ...	10	31.75	90	5.56	1.77	0.08	0 02	45
" " ...	11	113	94	2.80	3 16	0.20	0.19	45
" "	13	102.5	95	3.40	3.49	0.14	0.12	45

It will be seen that there is a wide variation in the per cent. of fat left in the skim milk from the different cows, when the whole milk was set under quite similar conditions. To take two extremes and compare them: we find that No. 8, giving milk containing 3.68 per cent. fat, left 2.26 per cent. fat in the skim milk, OVER 61 PER CENT., while No. 10, giving 5.56 per cent. fat in the whole milk, left but .08 of one per cent in the skim milk—*nearly 100 per cent. recovered.*

Take two others, Nos. 3 and 13. No. 3 gave an average of 3.60 per cent. of fat, and left .92 of one per cent. in the skim milk; No. 13 gave milk containing 3.40 per cent. of fat, and left .14 of one per cent. in the skim milk.

No. 3 gave a little over two pounds (2.02) of butter (fat) in two and a half days, from which were obtained but one and a half (1.58) pounds of cream; No. 13 gave three and one-half (3.49) pounds of butter (fat) in the same time from which three and one-third (3.37) pounds were recovered in the cream.

On a herd of ten cows similar to No. 3, there would be a loss of five pounds of butter in the skim milk out of every twenty pounds given in the whole milk. If each were producing one pound of butter per day, it would mean A LOSS OF TWO AND A HALF POUNDS A DAY on the herd, or 750 POUNDS IN 300 DAYS.

Ten cows similar to No. 13, which creams readily, would leave very little butter in the skim milk, and the loss in this way would be comparatively very slight on the same basis of production as assumed in the other case it would be about 102 POUNDS in 300 days.

This fat in the skim milk, however, has a value for feeding purposes, but not equal to its value in butter, *i.e.* where a fair price is obtained for it.

On the first herd it would mean an annual loss of $150 (750x20c. per lb.), minus its value for feeding purposes; and on the second $20.40.

To see whether the results would be better by allowing the milk to stand in the creamers for 24 hours instead of 12 as in the previous case, the milk from nine of the cows was set separately in deep cans, allowed to stand twenty-four hours before skimming, with the following results:

Table showing per cent. of fat in whole and skim milk from cows when set for 24 hours in deep cans.

Date.	No. cow.	Whole milk.				Skim milk.		
		Total lb. milk set.	Average temp. when set. deg.	Average per cent. fat.	Total lb. fat.	Average par cent fat.	Total lb. fat.	Temperature when skimmed. deg.
Oct. 12-13, (average 5 trials)....	1	42	92	4.5	1.89	0.47	0.16	43
" "	3	28	88	4.1	1.15	0.70	0.30	43
" "	4	23.5	87	3.7	0.81	0.60	0.12	43
Oct. 14-15, "	5	23	91	4.04	0.93	0.47	0.09	44
" "	6	39	93	3.40	1.32	0.50	0.17	44
" "	7	38	90	4.00	1.52	1.10	0.36	44
Oct. 21-22, (average 4 trials)....	8	12.35	90	4.86	0.60	0.71	0.08	42
" "	10	29.5	90	5.82	1.72	0.08	0.02	42
" "	11	74	95	3.10	2.29	0.37	0.24	42

It will be seen that in nearly every case better results were obtained by allowing it to stand 24 hours instead of 12; but it is doubtful if it would pay under ordinary conditions to allow the milk to stand 12 hours longer for the sake of obtaining a slightly larger amount more of cream. Nos. 3, 7 and 8 still cream very impefectly leaving from 0.70 to 1.1 per cent. of fat in the skim milk. In other words, Nos. 3 and 8 leave about 12 ounces of butter, or three-quarters of a pound, in every 100 pounds of skim milk, while No. 7 leaves over one pound of butter in every hundred of skim milk. No. 10 yields nearly all of her fat in the cream.

When the milk from Nos. 3, 4, 5, 6, 7 and 8 was mixed together and set, the average per cent. of fat found during seven trials was 0.62 of one per cent., while when tested separately the average was 0.92. This would seem to indicate *better results when mixed than when set separately*. The milk from Nos. 7 and 8 was mixed and set together in cold water, and 1.6 per cent. of fat was left in the skim milk. It would appear that the milk from these two cows *would not* give satisfactory results in creaming.

The milks of Nos. 8 and 10 were mixed, with the result that 0.7 per cent. of fat was left in skim milk. (It will be remembered that No. 10 gives up nearly all her cream quite readily.) This seems to have had a beneficial effect on the creaming of No. 8.

The whole milk of Nos. 5, 6, 7 and 8 were put separately through the "baby" separator, which left but .1 per cent. of fat in all, except from No. 6, when 0.2 per cent. fat was found in skim milk.

CONCLUSIONS.

1. There is a great difference in the creaming quality of milk from different cows, some yielding their cream quite readily, while others under ordinary circumstances will persist in leaving a large quantity of fat in the skim milk.

2. When the milk from a number of poor creamers was mixed together, better results were obtained than when they were set separately.

3. By mixing the milk from a poor creamer with one that yields her cream readily, better results on the whole were obtained than when each was set separately. *The milk from a good creamer assists that of a poor one.*

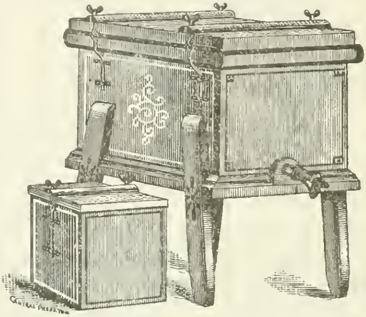
4. Good results were obtained from *all* when centrifugal force was applied.

EXPERIMENTS WITH BOYD'S VAT AND STARTER.

What is known as "Boyd's Process of Ripening Cream and Milk" having received some attention among dairymen, we included a twenty gallon cream vat and a one gallon fermenting can among our dairy utensils.

The ripening vat consists essentially of a tin vat surrounded by an air space or some non-conductor of heat, the tin being suspended in a wooden box, as seen in the accompanying illustration. The cover fits very closely so, that when it is fastened on the cream remains at about the same temperature as when it is put into the vat, no matter what the surrounding temperature may be, so long as it does not go too low.

The fermenting can is built on much the same plan.



The following directions accompany the vat and can :

To make the Lactive Ferment.

Take of sweet skimmed milk (that from a fresh cow preferred) one or more gallons as required, heat it in a water bath to 90° Fahrenheit.

While heating, the milk should be kept in constant motion by stirring. As soon as the temperature of the milk reaches 90° (ninety degrees) place it in the fermenting can and close the cover tight, having first rinsed out the can with warm water. Allow the can with the milk to remain closed until the next day (say 20 or 24 hours), when the ferment will be found thick and in the proper condition for mixing with the cream or milk to be ripened.

How to Use the Ferment.

First bring the temperature of the cream or milk in the vat to 68° or 70° Fahrenheit in winter and 66° to 68° in summer, when the ferment is to be thoroughly incorporated with the cream or milk, by thoroughly stirring and mixing in the proportion of one to two per cent. of the ferment to the amount of cream or milk to be ripened.

Remove one or two inches of the top of the ferment which is not used, and strain that found under this top layer through a butter-milk or preferably through a hair seive in the above proportion into the cream or milk, the finer the ferment is broken up the more effective the operation will be.

After the cream or milk and ferment are well stirred and mixed at the above temperature, the vat must be closed and allowed to stand undisturbed until the next day, when the cream or milk will be found thick and mildly acid and in the proper chemical condition for churning, and only requires to be cooled to the proper temperature for churning, say 58° to 60° in summer and 60° to 62° in winter.

After the cream or milk and ferment are mixed, no more stirring is admissible, as any agitation afterward retards the ripening process

The results of four trials made during the month of April, 1891, with 279 lb. of cream showed the following :

Boyd process,—average temperature for ripening, 69° ; average temperature for churning, 66° ; time of churning, 45 minutes ; pounds of butter, 52.

Ordinary process,—average temperature for ripening, 72° ; average temperature for churning, 66° ; time of churning, 33 minutes ; pounds of butter, 51.

In each trial the cream was evenly divided and an equal number of pounds of cream were treated according to directions by the Boyd process as were set in the ordinary method used in the dairy. The plan used at that time was to set the cream pail in a larger vessel containing warm water and allow to stand until properly ripened, usually about 20 hours.

These tests show a slightly increased yield of butter from the Boyd method, but this was all made on one churning where the cream set in the ordinary way was chilled during the night, owing to the fact that the fire went out. In all the other trials where the cream in the pail was kept at a proper temperature for ripening (70°) there was no gain in using the Boyd process.

There is no doubt that in winter, where persons have not the necessary heat to keep the cream at a proper temperature while ripening, some such vat or tank, which can be closed so as to exclude the outside air, would be of great service in maintaining that equable temperature so necessary to properly ripen cream.

From experience gained at the fairs, where about a cupful of cream the right degree of sourness for churning, was added to sweet separator cream 18 hours before it would be required for churning, we should be inclined to say that a small amount of fresh sour cream would answer the purpose of a ferment as well as that made from skim milk, and would be less trouble.

As a consequence of the results of ripening cream in the Boyd vat during the month of December, we are inclined to recommend this close covered method in preference to exposing the cream to all the changes of the atmosphere. The cream and the butter appear to have a richer, more aromatic odor than that ripened in an ordinary cream pail or open vat. To retain all the richness of flavor imparted to the milk, cream and butter by the food and the cow, we are not sure but that it will be best to stir and expose the milk and cream as little as possible, presuming of course that the cow, the food, the milker, the stable and the dairy are kept as clean as a well regulated dairy ought to be.

SWEET CREAM BUTTER.

At the present time we hear a great deal concerning sweet cream butter—about its difference from sour cream butter, in keeping quality, flavor, temperature for churning, effective churning, etc. Some claim that as good butter can be made from sweet cream as from sour, in fact they say it is more perfect and that there is a double chance of selling it, first as sweet cream butter, and then, if not sold as such, it will gradually take on the ripened or acid cream butter taste.

Cream is that portion of milk which rises to the surface and contains the principal portion of the fat of the milk, together with some of the casein and albumen. If left for twenty-four hours at a temperature of from 60° to 70° sweet cream becomes sour, thickened and takes on a different odor. The cause of the first and last change is due to bacteria or small organisms which get into the cream and form lactic acid and also the peculiar aroma. The thickening is due to the slight precipitation of casein, or to curdling, caused by the acid which forms as a result of the growth of bacteria.

The result of the ripening of cream then is not only its souring but the production of other changes as just stated.

Sour cream churns more easily than sweet cream, if the latter be churned at a temperature low enough to obtain all the butter. But sweet cream may be churned just as quickly as sour cream if it be churned at a proper temperature, and it may be churned just about as effectually if the temperature be sufficiently low.

TEMPERATURE FOR CHURNING SWEET CREAM.

The following table gives the results of experiments with temperatures in churning sweet cream during October and November. The highest temperature was 63° and the lowest 52°.

Date.	lb. cream.	Temper'ture of churning.	lb. butter.	lb. buttermilk.	Per. cent. fat in buttermilk.	Temper'ture churning room.	Time of churning.	
		deg.				deg.	hrs.	min.
Oct. 5th	35	55	6	29	0.7	64°	0	50
" 8th	78	54	15	63	0.8	60°	1	18
" 10th	66	54	12.75	53.25	1.2	63°	1	15
" 12th	78	53	15	63	0.8	58°	1	55
" 15th	72	52	14.50	57.50	0.4	60°	1	32
" 29th	77	52	17.0	60	0.4	56°	1	50
" 30th	37	61	7	30	1.6	60°	0	40
" 31st	31	62	5	26	1.8	60°	0	30
Nov. 16th	(1) 31½	63	6	25.50	1.1	59°	0	25
	(2) 31½	54	6.25	25.25	0.4	59°	1	10
" 19th	36	52	7.25	18.75	0.3	62°	1	38

When sweet cream was churned at 52° the average per cent. of fat left in the buttermilk was 0.36, and at 54° it was 0.8 per cent. When churned at over 60° the average per cent. of fat was 1.5.

These experiments would seem to show that to obtain nearly all the butter from sweet cream, at this time of year and from such cows, it is necessary to churn it at a temperature of 52 to 54. If a higher temperature than this is used, from three-quarters to one and a quarter pounds of butter may be expected to be left in every one hundred pounds of the buttermilk.

TIME REQUIRED TO CHURN.

As shown in the preceding table, sweet cream may be quite effectively churned if the temperature is low enough, but a low temperature means a long time in churning. In eight trials where the average temperature was 52°, the average time to churn was *one hour and twenty-six minutes*, which is too long for a small churning. In three trials where the average temperature wes 62° the time required was 32 minutes, but this temperature left too much butter in the buttermilk for profitable work.

FLAVOR AND KEEPING QUALITY.

So far as we were able to tell, there did not appear to be much difference between the flavour of sweet cream butter and that from sour cream, in from one to three days after it had been churned and worked. In fact, it would require an expert to be able to detect the difference for the first two or three days after the churning. In a week, however, and sometimes in less time, we were convinced that the keeping quality of sweet cream butter could not be depended upon.

The first four churnings and a portion of the fifth here reported upon were packed in a tin lined tub, great care being taken to ensure good work and each churning being covered with a brine to exclude the air until the next was made. Before the tub was full the bottom churnings in the tub were off flavour, in fact were quite rancid.

Another tub, partly filled, was packed from the churnings of Oct. 15th to 31st which also went off flavor quickly in from eight to ten days, but the top of the tub which had been churned at 61° 62° *appeared to keep better than* the lower portion of the tub *which had been churned at a low temperature* and *for a long time.*

December 9th we made a churning of sweet cream from the separator, and at this writing (three days after) signs of "off flavor" are already apparent in the butter which was made into pound prints and wrapped in parchment butter-paper which had been previously wet in brine.

CONCLUSIONS.

1. Sweet cream may be churned quite effectually at a temperature of from 52° to 54° in the autumn, if a person be willing to devote from one to one and a half hours to each churning.

2. So far as we were able to judge, there did not seem to be much difference in the butter from sweet cream as compared with that from sour cream in from two to three days.

3. The results of our experiments would lead us to conclude *that we need not expect sweet cream butter to keep in good condition longer than one week.*

4. Sweet cream from the separator (one trial), did not require so long a time to churn, but in keeping quality there was no difference between it and that obtained from setting.

5. We would not advise the manufacture of sweet cream butter under ordinary conditions.

THE SETTING OF MILK DELAYED.

In the farmer's dairy it is often quite impracticable to set milk as soon as it comes from the cow. It can be done by an extra amount of exertion, but when something else is demanding attention time will be lost by stopping work to set the milk at once. The question is, whether it would pay to go to much inconvenience to set at once.

In the trials here reported a certain number of pounds of milk were divided equally, one-half being set as soon as possible after milking in the Cooley creamer, while the other half was allowed to stand from a half hour to two hours (sample No. 5), in the dairy room or on the walk outside the dairy building. Four of the delayed settings were cooled in water and afterwards strained into the Cooley can before setting. All the delayed settings were strained before being placed in the Cooley cabinet for the cream to rise.

The results with twenty-four and twelve hour settings are given in the following tables :

Date.	Milk set immediately.					Set after standing one hour.				
	Whole milk.			Skim milk.		Whole milk.			Skim milk.	
	lb. set.	Temp. when set.	Per cent fat.	Per cent fat.	Temp. when skim'd.	lb. set.	Temp. when set.	Per cent fat.	Per cent fat.	Temp. when skim'ed.
Set 24 hours.		deg.				deg.	deg.			deg.
Nov. 2nd a.m.	(1) 42	84	3.6	0.5	40	42	80	3.6	0.60	40
" " p.m.	(2) 32	90	4.1	0.5	39	32	83	4.1	0.50	39
" 3rd a.m.	(3) 45	89	3.9	0.4	40	45	79	3.9	0.55	40
" " p.m.	(4) 27	91	3.8	0.4	40	27	83	3.8	0.50	40
Average....	36.5	89	3.85	0.45	40	36.5	81	3.85	0.54	40
Set 12 hours.										
Nov. 4th a.m.	(5) 32	90	3.75	0.30	39	32 *	76	3.75	0.40	39
" 5th a.m.	(6) 16	94	3.40	0.60	41	16	50	3.40	0.80	41
" 11th p.m.	(7) 14	92	3.35	0.45	40	14	68	3.35	0.45	40
" 6th a.m.	(8) 18	91	4.20	0.50	39	18	54	4.26	0.90	39
" 6th a.m.	(9) 19	86	4.15	0.60	45	19	61	4.15	0.60	45
Average....	20	91	3.78	0.49	41	20	62	3.78	0.63	41

* Cooled in water and afterwards mixed and strained into the creamer can.

The results of four trials set 24 hours in a Cooley creamer show an average of .45 of one per cent. of fat found in the skim milk when the whole milk was set immediately at an average temperature of 89° and when the setting was delayed from one-half hour to one hour the average temperature falling from 89° to 81° the per cent. of fat in skim milk was .54, or only .14 of one per cent. more than when set immediately. We may conclude, then, that from these cows, and at this time of year, so long as the milk is at 80° or above, the cream will rise almost as perfectly as when set at a higher temperature and as soon as posssible after milking.

The average of five trials, set for twelve hours at a temperature of 91°, showed .49 per cent. of fat in skim milk, and the average fat found when cooled to 62° was but .63 per cent. In these trials set at 62°, a fall of 29° before setting, there was but .14 of one per cent. more fat in the skim milk, than when set at 91°.

CONCLUSIONS. As far as loss of fat in the skim milk is concerned, there would not seem from these experiments to be much difference whether the milk be set at once or delayed, so long as it is cooled to about 40° before it is skimmed. We may conclude, then, that it will not be necessary under such conditions as here stated to go to much trouble to set the milk immediately in order to recover all the fat. At the same time, it will be best to set the milk as quickly as convenient, that it may be placed away from possible contamination from the air or otherwise and it will also add considerably to the appearance and order of the dairy to finish all work, including the setting of milk, as quickly as possible after milking.

MISCELLANEOUS MATTER.

Babcock and Beimling Tests.

Having used both of these tests for some time in connection with our experimental work, we are now prepared to give an opinion as to the relative merits of the two for practical work in a dairy. The essential differences in the two are:

1. The Babcock bottles are larger and the graduations not so fine as in the Beimling. It requires good eyesight and strong light to make the readings in the case of the latter with the bottles which we have.

2. Babcock method requires more milk for a test (17.6 c. c.) than does the Beimling (15 c. c.).

3. The Babcock uses one chemical (sulphuric acid) only, and cold water; the Beimling requires two chemicals (sulphuric acid and amyl chloride).

4. The Babcock requires a longer time for whirling the bottles.

5. The reading of the Babcock gives the per cent. of fat directly on the bottles, while with the Beimling it is necessary to refer to a "ready reckoner" to obtain the per cent. of fat.

We prefer using the Babcock method because with it there is less time required to dissolve the curd (our Beimling bottles being too small), less danger of burning the fingers and clothing; less trouble in preparing and adding the chemicals, the final results are obtained more quickly (at least, we have found it so), and it is less expensive.

For the addition of the sulphuric acid we use a glass syphon with a glass stop-cock on it, which is permanently fixed in a gallon bottle of the acid. This bottle is kept nearly full all the time. In adding the acid the first sample may be measured and the test bottle set near, that the height of the acid and milk in it may be compared with other samples while filling. In this way by having the bottom of the syphon up such a distance from where the test bottles are sitting that their tops slip over it when tipped slightly, the acid may be added to a number of samples in a short time. The acid does not require to be very accurately measured.

In twenty-four comparisons between the Babcock and Beimling, the variations were as follows:

No.	Beimling. Per cent. fat.	Babcock. Per cent. fat.	No.	Beimling Per cent. fat.	Babcock. Per cent. fat.
1.	3.91	3.90	13.	3.05	3.00
2.	3.26	3.30	14.	3.22	3.30
3.	4.00	3.90	15.	2.88	2.60
4.	2.93	3.00	16.	2.70	2.60
5.	3.22	3.00	17.	3.44	3.30
6.	2.84	2.70	18.	2.70	2.70
7.	3.13	3.20	19.	3.26	3.40
8.	2.35	2.20	20.	3.26	3.20
9.	3.74	3.90	21.	3.09	3.00
10.	3.48	3.50	22.	3.13	3.40
11.	3.74	3.60	23.	6.36	6.60
12.	3.91	3.90	24.	3.05	3.00
	Average			3.36	3.34

A modification of these two methods has been proposed by Mr. Hutton, one of our graduates, which consists in putting 3 c. c. amyl alcohol in the test bottle before adding the sample of milk and then use either the Babcock or Beimling bottles and machines. The fat appears to be more liquid than if sulphuric acid alone be used, but our work with this showed that when the alcohol was used the reading was invariably higher, as will be seen in the results here given :

Babcock. per cent. fat.	Babcock + 3 c. c. amyl alcohol. per cent. fat.	Increase.
(1) 4.05	4.4	.35
(2) 3.50	4.3	.80
(3) 3.60	4.0	.40
(4) 4.00	4.4	.40
(5) 3.50	3.75	.25
(6) 4.30	4.80	.50

One comparison of the ordinary Beimling method with the use of sulphuric acid and alcohol, using Beimling bottles, showed 4.00 per cent. with Beimling chemicals and 4.35 when the alcohol and acid were used.

COMPOSITE SAMPLES.

When not possible to test samples every day, it would greatly lesson the labor required if composite samples would give the same results as the average of a number of samples. This is specially true where testing of milk is done regularly at a cheese factory or creamery.

Various substances have been proposed to preserve the samples from becoming thick and sour. Among them powdered lye and mercuric chloride (calomel) appear to have given best satisfaction. We used calomel, "preservitas" and a low temperature. Of calomel, one-twentieth of an ounce was put in each sample. (This substance being a poison we should prefer not to use.) "Preservitas" kept the samples just as well as did the calomel. The quantity used was about a teaspoonful for six samples. In the colder weather the samples were simply kept in a cool place with good results.

In taking samples for the composite sample, care should be exercised that exactly *the same quantity of milk* should be taken each time. If this is not done the results will not be at all accurate. Before taking a sample from the composite one it should be first heated to 80° or 90° that the cream may be more completely incorporated with the milk. The number of samples in each composite sample varied from six to eight. The number of days that the samples stood was from four to six. The average difference found in 39 samples determined by Babcock method was only 0.12 of one per cent. of fat, as will be seen from the following :

Composite sample. per cent fat.	Average of separate samples.	Composite sample. per cent. fat.	Average of separate samples.
1. 3.90	3.90	20. 4.20	4.73
2. 3.70	4.00	21. 3.80	3.78
3. 3.60	3.61	22. 3.75	3.73
4. 3.90	3.81	23. 4.00	4.04
5. 4.30	4.19	24. 4.40	4.38
6. 4.00	4.20	25. 4.20	4.20
7. 3.70	3.75	26. 3.60	3.56
8. 3.80	3.63	27. 3.40	3.43
9. 4.60	4.56	28. 3.60	3.76
10. 4.35	4.28	29. 3.70	3.84
11. 4.20	4.14	30. 3.40	3.33
12. 4.80	4.72	31. 3.40	3.42
13. 3.50	3.56	32. 3.40	3.56
14. 2.80	3.23	33. 3.65	3.61
15. 3.20	3.30	34. 3.50	3.58
16. 3.90	3.90	35. 4.20	4.33
17. 3.70	3.80	36. 3.20	3.14
18. 3.55	3.63	37. 3.60	3.68
19. 4.10	4.04	38. 3.50	3.37
		39. 3.60	3.72
Average of 39 samples		3.79	3.91

PER CENT. OF FAT IN WHOLE MILK, SKIM MILK AND BUTTERMILK.

While testing milk throughout the province we have found during the summer of 1891 that the average per cent. of fat found in 310 samples of whole milk during the months of July and August, was 3.9. Thirty-two samples tested below 3.0 per cent. and twenty-nine samples above 5.0 per cent. The lowest per cent. found was 1.9. The highest was 9.0.

During September and October 137 samples were tested : the average fat found was 4.1 per cent. ; the highest 11.2 ; the lowest 2.2.

The average of 447 samples tested during July, August, September and October was 4.0 per cent.

This is higher than the average per cent. usually found in milk, which may be explained thus : while quite a number of the samples are from mixed milk, or milk from a herd, the majority of them are samples from single cows, and besides that we are not quite sure that in the case of some of the very high tests (11.2 per cent. for example), that an accurate sample was taken, there being some rivalry at a few places, where the interest in the milk testing was keen, to see whose cow produced the richest milk.

In 17 samples of skim milk brought to be tested there was an average per cent. of fat amounting 0.55 of one per cent. The highest was 1.0 per cent. ; the lowest 0.2 per cent. Three of the samples tested one per cent. of fat, which is a considerable loss. It means that over one pound of butter is left in every 100 lb. of skim milk. Parties whose skim milk tested so high consoled themselves with the fact that the hogs and calves received it ; but it is a question whether, under ordinary circumstances, it pays to feed butter to calves and hogs.

The average of 35 samples of buttermilk (nearly all from our own churnings), was 0.62 per cent. fat. The highest was 1.6 per cent., and the lowest 0.2. The reason of the high per cent. of fat which we found in the buttermilk in some instances was either that of mixing sweet and sour cream just before commencing to churn as explained elsewhere, or of churning sweet cream at too high a temperature, as was found necessary to do in some cases, to have the churning completed within any reasonable time.

VARIATIONS IN FAT OF SAMPLES OF MILK TAKEN AT DIFFERENT PERIODS DURING MILKING.

The samples were taken from a Shorthorn grade cow which calved in April. The tests were made Oct. 5 and 6, and Nov. 19 and 20. Samples were taken at three and four different times during the milk. The results are as follows :

lb. given.		Per cent. fat, 1st sample.	Per cent. fat, 2nd sample.	Per cent. fat, 3rd sample.	Per cent. fat, 4th sample.
(1)	20	1.0	1.3	1.8	2.8
(2)	21	1.15	2.8	4.0	6.6
(3)	23	1.8	3.0	3.2	4.8
(4)	19	1.2	2.2	5.0	6.2
(5)	9	2.9	2.4	3.9	
(6)	12	1.6	3.3	5.05	

While, as a rule, the last samples are much richer than the first, there appear to be some exceptions. See Nos. 1 and 5, where in the case of No. 1 the fourth sample is only 1.8 per cent richer than the first, and in the case of No. 5, the first sample was richer than the second.

AN INCIDENT IN BUYING A COW.

On May 6th I went to a fair in the city to buy a cow for the dairy. All the cows had not been milked for some time previous and their udders were very full—at least those of the good milkers were. Having purchased one (a Jersey grade), she was brought to the stables and milked, giving twenty-five and a half pounds, which contained but *1.8 per cent. of fat.* This was an exceptionally low fat per cent., but her milk of the evening (9 lb.), contained *10.4 per cent. of fat.* Here was a variation of 8.6 per cent. in the two milkings. Her milk became normal in about three days. The milk of the first milking (that which had been held in the udder for about 18 hours) was set, the cream ripened and churned, but the butter made from it spoiled, becoming rancid in about two days.

Such practices of compelling the cow to hold her milk for a lengthened period is injurious to the cow, and as previously shown, injurious to the quality of the milk and butter, yet such a method of preparing a cow for sale or for showing is quite common.

AMOUNT OF LAND REQUIRED TO SOIL COWS.

To find out the area of land required to keep cows on green crops in the stable, two cows which had not been turned out at all in the spring, having been kept in the stable previously for experimental purposes, were fed on green crops in the stable from June 29th to Aug. 30th—a period of nine weeks. In addition to the green food consumed they were fed during this time 252 pounds of bran.

The first soiling crop used was clover of which two cows ate in three weeks 3,150 lb. (75 lb. each per day), which required 0.242 (not quite one quarter) acres of land to produce it. During the next three weeks (July 20 to Aug 9), they ate the same quantity of green peas, tares and oats, which required 0.233 acres to produce the food. From August 10th to Aug. 30th they ate 3,360 lb. (80 lb. each per day) of green corn which grew on 0.216 acres of land. The land was accurately measured in each case and the food weighed.

The green crops were not more than an average. About seven-tenths of an acre (0.691) produced feed enough for two cows (with the addition of 252 lb. barn) for 63 days. We might expect, therefore, to grow on about one acre sufficient green food to feed a cow for 200 days under ordinary conditions.

The yield of milk from the two cows kept in was quite satisfactory, but not what we might have expected from them on good pasture, judging from their record as compared with four other cows which had been under the same conditions previously but were on pasture during the time these two were kept in the stable. This may be largely accounted for by the fact that we had no separate stable in which to keep these cows; when the others were turned out night and morning after being milked, these two fretted considerably. To make a comparison of results with those obtained from pasture, it would be necessary to have a separate stable for such cows, that they would not be unnecessarily worried.

Your obedient servant,

H. H. DEAN,

Professor of Dairying.

THE TWELFTH ANNUAL MEETING

OF THE

AGRICULTURAL AND EXPERIMENTAL UNION

The twelfth annual meeting of the Ontario Agricultural and Experimental Union was held at the Agricultural College, opening on Thursday morning, February 5th, 1891, at nine o'clock. T. G. Raynor, B.S.A., Rosehall, Ont., occupied the chair.

The roll was called and the minutes of the last meeting read and approved, after which a few reports were made in a general way.

PRESIDENT'S ADDRESS.

GENTLEMEN,—It is with feelings of pleasure and gratitude that I call to order this the twelfth annual meeting of our Experimental Union—of pleasure because of familiar faces, associations, and recollections of by-gone days; of gratitude, because a kind Providence has smiled upon us and bountifully administered to our wants.

To you, the officers and students of our Alma Mater, the ex-students, the honorary members, the visitors, and to all interested, we give a hearty welcome and extend the right hand of fellowship. We wish you all to feel at home in this meeting and free to discuss the important topics relative to our noble calling, agriculture. These gatherings, which are so conducive to the stirring of our nobler passions, true patriotism and a love for our work, cannot fail to make lasting impressions for good on those who avail themselves of these privileges.

In reviewing the work of our Union since its inception we are struck with the progress it has made especially during the last three or four years. Our growth for the most part has been slow but firm. Formerly we were hampered by lack of funds, but now that our work is commending itself more strongly we are more liberally sustained, and I have the conviction that as we show the increasing importance and usefulness of our work we shall receive still greater aid. At present the Government grant is only $200. To meet the growing tendency of our work fully double that amount is required. Some one has said that "this is the age of conventions." We think the statement true, and although farmers are slow in accepting the situation, yet a great deal of improvement in farming may be traced to suggestions made at such meetings. To-day we have opened such a convention and no doubt the discussions will be productive of much good. We must no stop at the convention, however. With the experiences of the past year we should be able to make this the best meeting of the series.

Greater energy and skill are required now than formerly to make farming pay. Keener competetion, due to the development of the resources of other countries, the diminishing productiveness of our soils, and the financial depression now existing demand it. I believe, however, that our work in connection with this Union is helping and will help to a still greater extent this existing state of affairs. We, working in connection with other Experimantal Stations of our Dominion, are arriving at results which will be of paramount importance to our agricultural interests.

Experimenting is the most practical side of our work, and to give some idea of what is being done, I may state that last year enough grain and fertilizers were sent out for 300 plots. Six experiments of this nature were going on, and some sixty-eight experimenters engaged in it. Our experiments have not always been what some would call successful; nor could we expect them to be. They are none the less useful, however, as they may prevent errors of a like nature on a more extended scale. We are thankful for the hearty support given by those who have helped us conduct experiments in the past, and we still court their favour in the future.

We are grateful to the *O. A. C. Review*, which should receive our liberal and hearty support for devoting so much space to our Union work. I agree with our last worthy President that the *Review* could be made to serve a two-fold purpose, viz.: its present object, that of bringing the present and past students into a closer relationship, and secondly, of becoming the organ of our Experimental Union.

While our motto is "Ever Onward," yet I do not think we should move too rapidly in our work, nor undertake much new work; but rather, we should by repeated experiment prove the tests already made and bring our work to greater perfection.

It is a matter for regret that more of the ex-students are unable to attend our Unions. There are many reasons doubtless, yet we think if more were earnestly solicited by our district secretaries that a larger attendance would be the result. The district secretaries are not altogether to blame, as they have no list of the ex-students belonging to their districts and have no means of getting one except by examining a number of college reports. Could not something be done to provide lists?

Now, gentlemen, I have to thank you for the honor conferred upon me in electing me as your president last year, and that in my absence; also for your kind indulgence in listening to these remarks. I trust this year may be marked by still greater progress than ever before in agricultural pursuits, and that each of us may be spared to contribute our mite. All of which I respectfully submit.

THE FUTURE OF THE LIVE STOCK INDUSTRY OF ONTARIO.

By Thos. Shaw, Professor of Agriculture, O. A. C.

The value of the live stock in Ontario in 1889, is computed at $105,731,288. The crops grown in 1889, the greater portion of which was consumed by the live stock of the Province, is estimated at $111,169,572. The entire farm property of Ontario is valued $982,210,664. These figures, which are taken from the Ontario Bureau of Industries, furnish us with an idea of the magnitude of the live stock industry of this country, which probably could not be obtained from any other source, unless it be through the export tables contained in the trade and navigation returns.

These tables inform us that the total amount of the live stock and products exported from the Dominion of Canada for the fiscal year, ending 30th June, 1889, amounted to $23,894,707, that the agricultural products exported, other than live stock amounted to $13,414,111, and that the export of agricultural products was $37,308,818, out of a total export of $77,201,804. It may also be mentioned here, that the export of live stock and live stock products from the Province in 1868, the first year of confederation, was $6,893,167, and of all other agricultural products $12,871,055.

From these figures the following deductions may legitimately be drawn, viz.: 1. That agriculture is by far the most important single industry of this Province, as the revenue which it furnishes, including the food consumed at home, is far more than that of all other industries combined. 2. That the revenue arising from the export of agricultural produce, other than live stock, is only 56 per cent. of that arising from live stock produce. 3. That the revenue arising from agricultural products in 1868, or twenty-one years prior to 1889, was 185 per cent. greater than that from live stock and live stock products, and that the amount relatively of the former as compared with that of the latter, has decreased in that time to the extent of 241 per cent. From the same authority we learn that in the years 1879 and 1889 the exports of the principal cereals grown in this country, viz.: wheat, barley, oats and peas were as follows:

	1879.	1889.
Wheat	6,610,724 bush.	490,905 bush.
Barley	5,383,922 "	9,948,207 "
Oats	2,373,290 "	337,185 "
Peas	2,714,995 "	1,982,853 "

During the ten years mentioned therefore the export of wheat had declined 90 per cent., of oats 85.78 per cent., and of peas 26.70 per cent., while the export of barley had increased during the same period by 84.77 per cent. The export of barley, nearly all of which went to the United States, has since been virtually cut off by the passage of the McKinley Act, as no doubt the framers of that Act designated that it should be.

In 1889 the import of corn from the United States, for home consumption, was 2,894,838 bushels. The amount of corn exported by the Dominion the same year, which was the produce of Canada, was 465 bushels. The cash outlay for corn imported into Canada in 1889 was $1,266,910, that is to say the amount paid out for corn imported into this country in 1889, in the face of a duty of 7½ cents per bushel, was only $283,139, less than the amount received for the combined export of oats and peas the same year.

The logic of these figures is simply irresistible. They say to us as plainly as language can convey ideas, that so far as this Dominion is concerned, from Ontario to the Atlantic, the grain selling era is forever gone, and that the best interests of the farmers in this portion of the Dominion lie in the production and sale of live stock, and the products of the same.

The gradual increase in the value of our exports of live stock and live stock products, and the gradual decrease in the amount of wheat and coarse grains exported, except in the case of barley, point to a time when our export of these will cease entirely from Lake Huron to the Gulf of St. Lawrence. Now that our barley trade has received a fatal blow, that time has already virtually come. Any policy, therefore, which in the future, will enable Ontario farmers to buy feeding stuffs where they can, will tend to foster the growth of the live stock industry, through which this country is destined in the future to become superlatively great, if our farmers are only true to themselves.

It is impossible to do justice to the subject of the future of the live stock industry of Canada without considering our markets for the same. This I now propose to do. Our principal markets for live stock of all kinds and the products of the same that we have held for sale in the past, have been Great Britain and the United States, and judging by the indications of the present, they will continue to be so in the future. We do not export much to either of these countries in the dead meat form, and whether we will ever do so is one of the problems which the future alone can solve.

The amount of live stock and products exported to these countries in the living and dead meat forms during the fiscal year ending June 30th, 1889, is as follows:

	Great Britain.	United States.
Horses	$ 26,975	$2,113,782
Cattle	4,992,161	488,266
Sheep	303,009	918,334
Wool	470	216,918
Cheese	8,871,205	31,473
Eggs		2,156,725
Bacon and Hams	378,736	87
Hides, other than fur	7,070	454,105
Butter	174,027	7,879

From these figures it is apparent that our principal market for horses, sheep, wool, eggs and hides up to the present has been the United States, and that our principal market for cattle, cheese, bacon and butter is that of Great Britain. The passage of the McKinley Act has greatly injured our market to the United States in horses, wool, and hides, and it has practically annihilated the same in cattle and eggs. That it has destroyed our trade in store cattle is no matter of regret, for if our farmers can be taught the folly of selling store animals at the cost of the loss of a market to the extent of half a million of money, the gain will soon more than counter-balance the loss. The markets for all these products and many more in Great Britain, remain as gloriously free as the winds that waft her ships o'er all the seas of earth, and so they will continue till we and our sons are dead, an object lesson to all the world of the value of unfettered trade.

That the future of our live stock industry will be greatly affected by coming legislation in the United States is beyond the shadow of a doubt, and the element of uncertanity that hangs over this legislation perplexes us somewhat as to how we should shape our course. The safe rule for us to follow at present is to moderate our production in those lines which are adversely affected by the McKinley tariff, to increase it in those which are not so affected, to still further increase our production in lines in which we have already captured the British market, and tó strengthen our position there in every possible direction wherein we may be weak at present.

From this it follows that we should moderate our production of horses. The United States is our only market for these. The cheaper classes of horses are now shut out of that market. Our only hope, therefore, in this respect in the meantime lies in the production of horses of a better quality. The rapid extension of new modes of travel and of communication say to us quite as loudly as the McKinley legislation that we should moderate our production of horses.

There is great reason, however, for the extension of the sheep industry. At present the whole number of sheep in this Province is only 1,344,180 head, that is but one sheep for every 16½ acres of the assessed lands of the Province. By raising sheep of the right class we would get a ready market for one million more lambs than we now raise. These would be sold in the market of the United States and Britain, and would bring in the former country in autumn an average of $5 per head, and in the latter country when one year old from $8 to $10 per head. In the item of sheep alone we would more than make up for the loss from an injured trade in horses and poultry, and we could do this without interfering with any one of the other lines of live stock production if we pasture judiciously in summer and feed properly in winter. We could fatten one million lambs in the autumn on 100,000 acres of rape, which is only the one hundred and fourteenth part of the arable lands in Ontario. The style of sheep wanted for this purpose is the progeny of such ewes as we have, and from darked faced rams, particularly those of the large types, as the Shropshire, Oxford and Hampshire Downs. If we now can get from Great Britain about $5,000,000 annually for our beef, why may we not grow beef enough to secure $10,000,000 annually from the same source? If we now can procure about $8,000,000 a year for our cheese from the same country, why may we not produce enough to bring us a return of $16,000,000 a year? The market for both these products is unlimited, and the extent to which we occupy it, may only be hedged in by our own desire and ability to produce beef and cheese.

The market in Britain for our pork is as wide as our ambition may care to make it. It is true that in that market we come in competition with American pork. But with our beef and our cheese we have a similar competition, and when Canada comes in competition with the United States in the line of live stock and live stock products the results are always the same, the beaver has been found more than a match for the eagle. Our cheese industry substantiates this statement. The same is true of our beef industry, and it finds further confirmation in the millions of our exports which, during recent years, have climed over tariff walls and found a place side by side with American products on American shambles. That our production of live stock and live stock products may be doubled within fifteen or twenty years in quantity, and also increased 100 per cent. in quality, that is, quadrupled in value, may seem a strong statement, but it will only seem so to those that are not conversant with the possibilities of this country. The increase in quantity may be be brought about through a better method of farming, and the increase of the latter through improved methods of breeding and feeding. Two of the principal factors in the former will be the growth of corn and rape, and in the latter, pure bred sires and feeding done on the lines laid down in the bulletins issued by our Experimental Stations. If only pure bred sires were used for the time indicated by simply repeating the upgrading in the same lines continuously all the live stock of this country would be as good as pure for practical purposes, and our possessions in this line in quality would present a spectacle without the approach of a parallel in any country in the world. Our live stock would then be worth $421,925,152, and not $105,731,288 as now. And all this could be effected without clearing another acre of the forest, or drying another acre of the swamp. But this is only a picture of what may be, rather than of what will be in the coming days of great improvement.

The possibilities of live stock improvement and production in this country in the future are very great. The unparalleled growth of American cities will in all probability arrest the great volume of the export of American agricultural products before two or three decades pass away. Then, if not till then, tariff walls will fall like those of Jericho, and our live stock and products will have unfettered access to the markets of both England and America.

The cries of loyalty and disloyalty fill the air at present. They resound on every hand, and in those days of independent thinking every man probably frames his own definition of loyalty. It is my purpose to do the same and I give it for what it is worth

In view of the transcendant importance of the live stock industry to Canada, I regard every citizen thereof in a sense disloyal who discourages the growth of more and better stock and live stock products, and who encourages the export from Ontario at least, of the food that should be fed to these, that it may be returned again to the soil.

The live stock industry of Ontario will, therefore be immensely greater in the future than at present, if the farmers of Ontario are true to their own best interests, and true to themselves. It is now the great mustard tree of the country, beneath the branches of which all other interests find an existence. Take away the live stock interests from Ontario and you leave only the husks of grain selling to an impoverished people. You stop the water wheel that drives the manufacturing establishment, and you leave the merchant in his counting house preparing for the inevitable crash of disaster which is to lay his business in the dust, a forlorn and hopeless ruin.

Whoever, therefore, introduces better methods of stock raising and will teach men these, is more worthy of the gratitude of this country than Wolfe, who bled at Abraham, or Brock at Queenston Heights.

To return again to loyalty, there is no loyalty to this Province at the present time that is to be compared to that devotion which persistently brings before our people those methods of live stock improvement, which will keep us in the van of other nations as a live stock producing country. Those men who are instrumental in filling our country with silos and butter and cheese factories, to say nothing of fields of rape, are worthy of being enshrined forever in the grateful rememberance of a people made prosperous and powerful through their loyalty to duty.

The influences that conjointly will lead to this improvement are many. They include the teaching of the press, the encouragement given by the live stock and agricultural associations, which now are happily numbered by the hundreds, and legislation in the interests of the farmer, which, like sunrise in December, though long in coming has come at last.

But there is yet one influence, not mentioned sooner, on the principle that the best wine should be kept to the last, the influence of the teaching of the Ontario Agricultural College through her graduating classes. Every student of this College should prove a centre from which a light of better methods will emanate and radiate for the uplifting advancement of agriculture. He will, or should, prove leaven in the neighborhood in which he follows the plow, which, like that put in the meal, went on with the work of transformation until the whole was leavened. He should never forget that the roll of parchment which he bears away from this college on graduation day was given him as a sort of Magna Charta, empowering, authorising and requiring him so to conduct his farm that its management will secure from the people that admiration and respect for this college of which it ought at least to be deserving.

The first business taken up by the Union on the second day was the report of the nominating committee. The election of officers resulted as follows:

OFFICERS FOR 1891-2.

Honorary President	J. Hoyes Panton, M.A., O. A. College, Guelph.
President	Elmer Lick, Oshawa.
Vice-President	W. W. Ballantyne, Stratford.
Recording Secretary-Treasurer	J. A. B. Sleightholm, Humber.
Corresponding Secretary	R. F. Holtermann, Brantford.
Editor	C. A. Zavitz, B.S.A., O.A. College, Guelph.
Auditors	R. N. Morgan and R. Harcourt.

DISTRICT OR COUNTY SECRETARIES.

Secretary.	County.	Post office.
W. A. Mattice	Stormont	Cornwall.
W. L. Carlyle	Dundas	Chesterville.
G. G. Sheriffs	Russell	Clarence.
E. G. McCallum	Glengarry and Prescott	Martintown.
J. C. H. Sparrow	Carleton	Antrim.
H. E. McCrae	Grenville	Brockville.
P. McLaren	Lanark	Perth.
W. Lindsay	Renfrew	Loch Winnoch.
J. C. Stagg	Leeds	Brockville.
B. C. Brown	Frontenac	Kingston.
D. Aylsworth	Lennox and Addington	Bath.
H. L. Ridings	Hastings	Frankford.
W. Haight	Prince Edward	Wellington.
Wm. Wiancko	Muskoka	Sparrow Lake.
Wm. Merrison	Haliburton	Minden.
Wm. Birdsall	Peterborough	Birdsall.
H. Field	Northumberland	Cobourg.
J. L. Fair	Durham	South Monaghan.
T. H. Tinny	Victoria	Oakwood.
S. P. Brown	Ontario	Whitby.
R. A. Thompson	Simcoe	Thornton.
G. A. Brodie	York	Bethesda.
J. A. B. Sleightholm	Peel	Humber.
W. Ewing	Dufferin	Mulmur.
E. P. White	Grey	Clarksburg.
A. R. Vannatter	Wellington	Ballinafad.
H. Black	Halton	Scotch Block.
H. L. Beckett	Wentworth	Hamilton.
J. Harcourt	Lincoln	St. Anne.
A. M. Soule	Welland	Southend.
D. Z. Gibson	Haldimand	Willow Grove.
Allen Shantz	Waterloo	Waterloo.
A. G. McKenzie	Oxford	Fairview.
G. N. Hunter	Brant	St. George.
B. E. Kitchen	Norfolk	Waterford.
D. Buchanan	Huron	Hensall.
N. Monteith	Perth	Stratford.
J. B. Muir	Bruce	North Bruce.
N. Morgan	Middlesex	Kerwood.
W. J. Brown	Elgin	Aylmer.
N. J. Clinton	Essex	Windsor.
B. Robinson	Kent	Wheatley.
A. E. Wark	Lambton	Wanstead.

COMMITTEES ON EXPERIMENTS.

Agriculture.—Profs. Shaw and James, Messrs. Zavitz, Hutt, Hewgill, Gibson, White, Story and Soule.
Horticulture. Prof. Panton, Messrs Lick and Clinton.
Dairying.—Prof. Dean, Messrs Beckett and Perry.
Live Stock.—Prof. Shaw, Messrs. Buchanan and Monteith.
Apiculture.—Messrs Holtermann, Husband and Haight.

REPORT OF EXPERIMENTS IN AGRICULTURE.

On behalf of the Committee on Agricultural Experiments, the editor reported the work done during the year 1890. The number of experiments have been increased to six, being two more than were conducted during the previous year. Circulars containing the full instructions regarding each experiment, and also containing blank forms on which to fill in the results of the work, for returning after harvest, were sent to the members of the Union, and also to a number of other agriculturists who were not members. In receiving replies we found there were sixty-six different parties, each willing to undertake one or more of the prescribed experiments. The grains, seeds or fertilisers were forwarded free of charge to the nearest express office of each experimenter, who was in return to carry on the tests according to the printed instructions and return the record of results to the College in the Autumn.

Material was sent into thirty different counties over Ontario, and in sufficient quantities for experiments upon three hundred and twenty-five plots.

No. I.—GRAIN ON PLOTS FERTILISED IN SPRING OF 1887.

(1) Carefully sow the four lots of oats on the four plots used for the experiments of 1889, and take necessary notes. (2) Fill out the accompanying blank form and return according to directions on front page.

NOTE.—The price of the superphosphate was $26 per ton and the dried blood and scrap $40 per ton.

The result of one experiment is given, the experimenter being C. D. Bowman, of Waterloo County. The soil was a loam and had been previously cropped with oats. Each plot was sown on May 3rd, and each matured about August 13th.

Plot.	Fertiliser applied in 1889.	Weight of—		Weight per bushel of grain.
		Straw.	Grain.	
		lb.	lb.	lb.
1	Superphosphate	74	32	36½
2	Dried Blood and Scrap ..	73	29	36
3	Farmyard manure.....	80	35	37
4	No manure.............	71	29	36

The general appearance of the straw was characterised as bright on plots one, three and four, while plot two was rusty. The grain in each case was not very well filled.

NO. II.—SUPERPHOSPHATE, DRIED BLOOD AND SCRAP, FARMYARD MANURE, AND NO MANURE WITH OATS.

(1) Select a piece of ground of same nature throughout, and representative as far as possible of the land of the neighbourhood. Avoid naturally rich soils or those which have had recent applications of manure or special cultivation. Keep clear of wet spots, trees, fences and buildings. Give cultivation to experimental plots similar to that of your larger fields. *An advantage would be gained if the plots could be chosen in such a postion that they could remain for experiment another year.*

(2) Mark off four plots of one fortieth an acre each, leaving a clean path two feet wide between the plots. Two rods square is a convenient shape.

(3) Submit all plots to same treatment, and sow one forth of grain sent on each. Aim at seeding one inch deep.

(4) Apply the superphosphate sent to plot No. 1; the dried blood and scrap sent to No. 2; farmyard manure to No. 3, and leave No. 4 without any manure. The fertilisers to be sown at the time of seeding

(5) Keep plots at all times clear from trespassing by poultry, etc.

(6) Aim at sowing 700 lb. farmyard manure on No. 3 plot (14 tons per acre.)

(7) If it is your wish to carry on this experiment, please inform the Secretary, as named on front page, naming your nearest express office, and there will be sent to you, expressage prepaid, 7½ lb. oats ; 10 lb. superphosphate for plot No. 1, and 10 lb. of dried blood and scrap for plot No. 2.

Following are the results of six experiments.

No. of plot.	Fertilisers supplied in spring 1890.	Weight of straw per plot.	Weight of grain per plot.	Nature of soil.	Previous cropping.	County.	Experimenter.
		lb.	lb.				
1	Superphosphate	64	41	Clay loam.	1889, barley. 1888, peas. 1887, hay. 1886, hay.	Ontario.	Elmer Lick.
2	Dried blood and scrap	76½	46½				
3	Farmyard manure	69¾	45¼				
4	No manure	71½	41½				
1	Superphosphate	28	21	Clay loam.	Oats.	Middlesex.	R. C. Alexander.
2	Dried blood and scrap	32	21				
3	Farmyard manure	44½	25½				
4	No manure	32	21				
1	Superphosphate	69	35	Clay loam.	Potatoes.	Muskoka.	Wm Goldthorp.
2	Dried blood and scrap	69	35				
3	Farmyard manure	110	34				
4	No manure	76	35½				
1	Superphosphate	53	35	Sandy loam.	Peas, 1888. Wheat, 1889.	Muskoka.	Enos. Walker.
2	Dried blood and scrap	41	27				
3	Farmyard manure	35½	29½				
4	No manure	31	20				
1	Superphosphate	.....	20	Heavy loam.	Oats.	Lambton.	W. Mowbray.
2	Dried blood and scrap	......	26				
3	Farmyard manure	....	32				
4	No manure	.....	12				
1	Superphosphate	83	26	Mild clay loam.	1888, hay. 1889, green crop.	Wellington.	Ont. Expt Farm.
2	Dried blood and scrap	99	26				
3	Farmyard manure	124¼	26¾				
4	No manure	68½	19				

Average yields of plots with and without fertilisers.

No. of plot.	Fertilisers applied in the spring of 1890.	Weight of straw, on plot.	Yield of grain on plot.
		lb.	lb.
1	Superphosphate 10 lb. per plot, (400 lb. per acre)	54.9	30.2
2	Dried blood and scrap, 10 lb. per plot, (400 lbs. per acre)	63.5	30.3
3	Farmyard manure, 700 lb. per plot, (14 tons per acre)	76.8	32.2
4	No fertilisers	55.8	24.8

NO. III.—APPLICATION OF SODIUM NITRATE TO WHEAT.

(1) From a field of wheat, select a part from which you can mark off two uniform plots containing one-tenth of an acre each (2 x 8 rods is the shape highly recommended). Make a clean path one foot wide between the plots. Drive stakes at the corners of each plot, with perhaps others at the centre of the sides, and run a small rope or cord from one stake to another, after which hoe a path one foot wide around the plots.

(2) If the crop is Fall Wheat, sow the sodium nitrate to Plot No. 1, as soon as the soil becomes fairly warm and dry in the spring ; if Spring Wheat sow the sodium nitrate when the crop is about two inches high.

(3) Leave Plot No. 2 without the addition of any fertiliser.

(4) Take necessary notes through the summer.

(5) Harvest separately and weigh the whole crop (if possible) from each plot ; thresh separately and carefully obtain the weight of grain in each case.

NOTE—Sodium nitrate usually costs about $60 per ton.

The results of six experiments are given below, three with fall wheat and three with spring wheat. (1) Fertilised with nitrate of soda 20 lb. per plot and (2) No fertiliser used.

No. of experiment.	No. of plot.	Size of plot.	Appearance of—		Weight per plot of—		Remarks on growth.
			Straw.	Grain.	Straw and chaff.	Grain.	
		Acre.			lb.	lb.	
I.	(1)	1/20	A little rusty.... ..	Very even and color good	275	93	Not so good as the other at first, but gained afterwards.
	(2)	1/20	Very rusty	Not so even	163	61	Good at first, did not make much progress afterwards.
II.	(1)	1/10	Strong but rusted...	Good color but small....	907	72	Very good all summer but rusted after grain was fully formed.
	(2)	1/10	“ ...	“	860	70	Same as (1).
III.	(1)	1/10	Strong and bright ..	Sound and bright	231½	122	(1) Much darker color and about eight inches taller than (2).
	(2)	1/10	Fine and bright.. ..	“	146	73	
IV.	(1)	1/10	Not very bright.....	Plump	......	122¾	About two weeks after sowing a much ranker growth was visible and continued so until ripe.
	(2)	1/10	Bright	“	....	119	
V.	(1)	1/10	A little rusted	Fair sample	301½	98½	In eight days after sowing had a dark green color. Straw ten inches taller than (2).
	(2)	1/10	“	“	269	90	
VI.	(1)	1/8	Badly rusted .	Somewhat shrunken . ..	......	117	Rank, three or four inches taller than the other.
	(2)	1/8	Slightly rusted	Fair sample	......	110	

I. By W. J. McNiven, Co. Lincoln, with Red Fyfe *Spring* wheat on a black clay loam previously cropped with oats but not manured since 1887. Fertiliser applied April 26 ; maturity, (1) Aug. 14, (2) Aug. 17.

II. By John Varcoe, Co. Huron, with Club *Spring* wheat on a very rich clay loam previously cropped with peas following a ten years' pasture to which barnyard manure had been applied. Fertiliser applied April 26 ; maturity (1) and (2) August 6.

III. By Walter Hartman, Co. Grey, with McCarling *Spring* wheat on a clay loam previously cropped with wheat not previously manured. Fertiliser applied May 3 ; maturity (1) and (2) August 27.

IV. By C. J. Bowman, Co. Waterloo, with Democrat *Fall* wheat on a sandy loam previously cropped with peas with no manuring for four years. Fertiliser applied April 29 ; maturity (1) July 20, (2) July 17. Did not weigh the straw but it was much heavier where fertiliser was used.

V. By James Gray, Co. Peel, with Democrat *Fall* wheat on a clay loam previously cropped with peas from an application of barnyard manure. Maturity (1) July 25, (2) July 28.

VI. By D. H. Moyer, Co. Lincoln, with Clawson *Fall* wheat on a clay preceded by corn and fallow. Corn was manured from the barnyard. Fertiliser applied April 19. (2) Matured three days earlier than (1).

Average yields of straw and grain *per acre* on plots fertilised and unfertilised.

Treatment.	Tons of straw.		Bushels (60 lb.) of grain.	
	Fall wheat.	Spring wheat.	Fall wheat.	Spring wheat.
With fertilisers	1.51	2.81	17.5	21.1
Without fertilisers	1.35	2.22	16.4	14.7

NO. IV.—TESTING NEW AND PROMISING VARIETIES OF GRAIN.

(1) Select a portion of uniform soil and divide into plots two rods long by one rod wide, driving stakes at the corners.

(2) On each plot sow one of the varieties of grain.

(3) Take necessary notes, weigh produce carefully, and examine the grain.

NOTE.—The grains distributed are among the most promising from upwards of 200 varieties grown on the O. A. C. experimental plots during the year 1889 from seed imported from different parts of Europe, Asia and Australia.

Many promising varieties of foreign and Canadian grains were distributed during the past season. The best varieties at the station for the past two or three years were chosen for the distribution. A careful study of the tables of returns goes to show that of the varieties sent out the following have made the best records for the year and in the order named.

Oats—1, Joanette Black ; 2, Bavarian ; 3, Chenailles ; 4, Black Oderbrucker ; and 5, Banner.

Barley—1, Common six-rowed ; 2, Cheyne ; 3, Italian Rice.

Peas—1, Glory ; 2, Early Racehorse.

Spring wheat—1, Herison Bearded ; 2, Holben's Improved.

NO. V.—DIFFERENT MODES OF CORN CULTIVATION.

(1) Select a piece of ground of same nature throughout, under same conditions, and representative as far as possible of the land of the neighborhood. Avoid naturally wet spots, and keep clear of trees, fences and buildings. Prepare the ground as you would a large field for the same crop.

(2) Mark out four plots of one-tenth of an acre each, allowing a clean path between the plots. Four rods square is a convenient shape for each plot.

(3) Sow the corn received in the following manner :

No. 1 plot—Drills of equal distance apart (as near 3½ feet as possible) with seed averaging two grains to the foot.

No. 2 plot—Drills of same distance apart as No. 1 with seed averaging 12 grains to the foot.

No. 3 plot—Broadcast or close drills with seed averaging one-half bushel per acre (2.8 lb. per plot).

No. 4 plot—Same as No. 3 with seed averaging three bushels per acre (16.8 lb. per plot).

(4) Aim at having the seeding all done in one day, and not later than 15th day of June. NOTE.—Shallow planting for early seeding, and deeper planting if late enough for soil to be warm.

(5) Give plots 1 and 2 the same amount of after cultivation, as often as you think they need it, but avoid mounding the rows ; shallow cultivation is preferred.

(6) Cut each crop at the time when its condition corresponds to the roasting condition of field corn, or when the ears are in the glazed state.

(7) Weigh produce from the plots when under as equal conditions as possible. NOTE If you can observe the comparative result from the feeding of the different lots please send information under head of "Conclusions" in blank form.

Following are the results of three experiments :

No. of plot.	Seeding and cultivation.	Distance apart of rows.			Average depth of planting.			Weight of produce per plot.		
		I.	II.	III.	I.	II.	III.	I.	II.	III.
		in.	in.	in.	in.	in	in.	lb.	lb.	lb.
1	Wide drills, two grains per foot.	42	40	42	2½	1½	2	2325	1053	1687
2	Wide drills, twelve grains per foot	42	40	42	2½	1½	2	2515	1586	1560
3	Broadcast or close drills (½ bush. per acre)				2½	1	2	1655	1549	1037
4	Broadcast or close drills (3 bush. per acre)				2½	1	2	2435	936	1932

I. By J. B. Muir, County Bruce, on a heavy clay. The soil was pretty well run down. Pastured during the last few years and top dressed in the spring with barnyard manure at 15 tons per acre.

The cultivated crops continued to grow right along, while the uncultivated ceased to grow about the middle of August. When cut September 18 only a very few stalks had tasselled and there was no silk.

II. By James Gray, County Peel, on a clay loam previously cropped with oat.

That the close sowing or broadcast is inferior feeding to the wide drills. That the twelve grains to the foot was the most profitable this season, but the two grains did not get a fair trial, as the rain storm of June 5 washed some of the seed out and made it too thin in places.

III. At Ontario Experimental Farm, County Wellington, on a clay loam previously cropped with corn.

Although the heavily seeded plot sown in close drills gave the highest yield, still the quality of the fodder was much inferior to that of the cultivated plots. The yield from sowing half a bushel per acre broadcast is not only small but the quality of the fodder is also inferior.

Average results from three experiments with fodder corn in 1889 and also three in 1890 :

Mode of Seeding.	Percentage of stalks having ears.		Average.	Yield of fodder corn per acre.		Average.
	1889.	1890.		1889.	1890.	
				ton.	ton.	ton.
Wide drills, two grains per foot .	51.7	46.7	49.2	8.8	8.4	8.6
Wide drills, twelve grains per foot.	1.7	18.3	10.0	10.0	9.4	9.7
Broadcast or close drill, ½ bush. per acre	13.7	3.3	8.5	7.4	6.2	6.8
Broadcast or close drills, 3 bush. per acre	....	... .	....	9.8	9.0	9.4

NO. VI.—THE GROWING OF LUCERNE.

(1) Select a one half acre plot, conveniently situated to the stables, and in such a position that it may remain unbroken for a number of years.

(2) Cultivate the ground thoroughly, making a fine seed bed.

(3) Sow one-half bushel of your own barley on the plot and seed with the 9 lb. of lucerne in the same way you would seed with red clover.

(4) If there is a heavy crop of lucerne in the Autumn, cut high ; if the crop is light, leave uncut.

NOTE.—Kindly take much care of this experiment as the 9 lb. of seed alone cost about $1.35. Do not get discouraged if the plants are somewhat weak and unthrifty the first year.

C. D. BOWMAN, Co. Waterloo : Part of the plot was a good loam and the balance was a black muck, previously cropped with potatoes, and the soil was dry. The date of seeding was May 3, and the seed bed was in good condition. There were not many weeds, and the ground was fairly well shaded by the cereal crop. The grain matured August 1st, and at harvest the lucerne was about ten inches high.

The lucerne did not grow much after the grain was cut, and was not cut in the fall. The lucerne got a pretty good catch, though not so good as the timothy, orchard-grass and clover on the half-acre beside it. The clover stood fairly even on the patch, and was nine inches high in the fall.

F. E. FARLINGER, Co. Dundas : The plot was clay loam, dry, with a previous cropping of wheat. The seed bed was in fair condition on the date of seeding, May 26th. The growth of weeds was considerable, notwithstanding the accompanying crop of oats. The grain matured August 30th, when the lucerne was six inches high.

A large number of plants, but they were weak. It did not have a fair chance, owing to the cold, wet season.

G. V. CHRISTY, Co. Prince Edward : The soil was clay loam, flat, but not at all cold or springy. It had been plowed in the fall and cultivated in the spring, having been previously cropped with potatoes and mangels. April 30th was the date of seeding. The barley made a good growth, but when that cereal was cut the lucerne was quite small. Weeds were very thick after harvest.

It made a good growth in the fall. The seed came up nicely and looked very fine for a time, but the drouth apparently killed it. However, when rain came, it revived, and it is now looking very well. I did not cut it, as I thought it would come through the winter best if left standing.

W. S. CLAPP, Co. Prince Edward: The soil was clay. dry, and had been cropped to peas. The date of seeding was May 8th. A lot of Canada thistles appeared, and the barley was not very thrifty. The grain matured on August 1st, when the lucerne was from six inches to a foot in height, and quite uneven.

It grew nicely after harvest and attained the height of about twenty inches. We think it has done well, and intend leaving it for a term of years if it does not winter-kill.

R. E. KITCHEN, Co. Norfolk . The soil was dry and sandy, and the crop followed hay There was a good seed bed at the time of sowing, April 16th. There was but little shade afforded by the cereal crop ; no weeds grew, and the lucerne was about three inches high at the time of the harvest.

Does not appear very healthy. It is tender and very discouraging, and does not appear to be making any advance at present.

J. G. McKAY, Co. Bruce : The crop followed spring wheat on a clay loam and washed soil (creek, flat, wet when rainy) which had been fall-plowed and gang-plowed in the spring. It was sown on the 31st May, and some grass sprang up with the crops. although good shading was afforded by the cereal. At time of harvest the lucerne was from two to four inches in height.

It seems to be doing fairly well considering the chance it got, owing to the creek overflowing and washing away considerable of the seed.

W. C. ZAVITZ, Co. Middlesex : The soil was a clay loam, moist, and had been manured, cultivated and harrowed after two crops of potatoes. May 3rd was the date of seeding. There were no weeds, and the crop was well shaded by the cereal. The grain matured July 23rd, and the lucerne was then from two to six inches in height.

The weather was very warm after harvest, and it grew slowly, but is growing fast now and looking very well.

G. A. Snyder, Co. Lincoln: The soil was clay, dry, and formed a good seed bed. The crop followed corn and was sown on April 22nd. There were no weeds, and the lucerne was well shaded by the cereal. It was three inches high at harvest, the grain maturing on July 25th.

The plants are strong, healthy, and have good roots. The spring rains gave the crops a fine start, and the fall rains have given them a good growth. I look for good results next year.

H. A. Burwash, Co. Bruce: The crop followed roots on a light clay loam, dry, and which had been prepared by a gang plow and disk harrow. Time of seeding, May 20th; no weeds. The cereal crop was very heavy, and the height of the lucerne at harvest (grain matured on July 15th) was scarcely noticeable.

The lucerne was very good, and made a growth of about five inches. The growth of barley was too rank to permit of any grass succeeding well, but the lucerne appears thriftier now—if it will only stand the winter.

Edgar M. Zavitz, Co. Middlesex: The crop followed peas in 1889 and sod in 1888. The soil was a light sandy gravel, dry, plowed in the fall and cultivated in the spring, The seed was sown on April 29th, and the summer grass came on quite thick. The barley was exceedingly thin, and the lucerne at harvest was very spindling, and about three or four inches high.

The crop just about held its own. It is very hard to decide at present what will be the result.

John Varcoe, Co. Huron: The crop succeeded fall wheat on a rich, deep clay loam, dry, plowed in the fall and cultivated in April. Sown on April 24th. There were no weeds, and the crop was shaded by a fair growth of barley. The grain matured on August 15th, and at harvest the lucerne was six inches high, but rather weak.

The fall has been very dry, and the growth since harvest has not been good, but the plants are in good condition. The seed came up nicely and grew well all summer, until after harvest, when, owing to the dryness, it did not make growth. The plants are in good condition for the winter.

Samuel Walker, Co. Huron: The soil was a clay loam, dry, fall-plowed and gang-plowed in the spring, and the crop followed mangels. Date of seeding, April 15th. No weeds. The grain matured about the 6th of August, and the lucerne was about six inches in height at the time of harvest.

The lucerne was rather delicate at the time of harvesting, but looks better this fall.

F. Birdsall, Co. Peterborough: The crop was sown on April 23rd, on a dry sandy loam, which had been plowed in the fall and gang-plowed in the spring. The preceeding crops were: 1888, carrots; 1889, oats; 1890, barley. Very few weeds, and the lucerne was shaded but slightly, as the barley was thin and short. The lucerne was about three inches high at harvest; the barley matured on August 4th.

It seemed to grow fairly well in the fall, but spindling and not of a good green color. It made very little growth until after the barley was cut, when it grew fairly well, but it did not look healthy. I applied plaster on it in June, and gave it a top dressing of barnyard manure in September.

Levi Pike, Co. York: The land was a very stiff clay, dry and well drained, harrowed and cultivated, and the crop followed peas. Date of sowing, April 26th. There were no weeds. The lucerne was shaded by the accompanying cereal, and was from six to eight inches in height at the time of harvest.

It headed out, but did not need cutting. It was not pastured.

THE FARMER'S FRUIT GARDEN.

By H. L. Hutt.

Fruit growing in many parts of the province has become a specialty and one of the leading industries, yet much good would result were it practised in connection with farming, on a smaller scale, but over a much wider area of the province, even in those parts which are not, strictly speaking, fruit sections. For although political economists lay down the rule that articles should be produced where this can be done most easily, and purchased where they can be had most cheaply, still it is quite evident that if farmers do not produce their own fruit the majority of them will be without it, and thus be deprived of one of the greatest gifts nature bestows on mankind.

The advantages resulting from an abundant supply of fruit are seldom over-estimated. It is conducive to good health. Medical authorities are agreed that it should form a portion of every healthy diet. Besides being a necessity it is a luxury, well worth all the trouble and expense it cost to produce it. In one form or another we all enjoy fruit. To say nothing of apples, raw or baked, in pies or in sauce, how delicious are cherry and blackberry pies, raspberry and gooseberry jams, currant jellies or plum preserves! And what is more palatable for dessert than a cluster of beautiful Niagara grapes, or a well ripened Bartlett pear? And why should not these health-giving delicacies be found upon the farmer's table the greater part of the year?

Some of the excuses offered by farmers for neglecting this important branch of the farm are that they have no time for it, or their soil or climate are not suitable, or it is accompanied by too many failures. All such objections can be easily met, leaving the negligent in this respect without excuse. If we adhere to the old plan by which the fruit lined the fences, barricading the plot of ground known as the garden, and on which all the work had to be done by spade and hoe, we probably could not find time to give the cultivation necessary. But in these days of economised labor, the wide-awake farmer grows his fruit and vegetables in rows, so the work is nearly all done by plow and cultivator as easily as he manages his corn or roots. There is, then, no more excuse for the man who cannot find time to provide fruit for himself and family, than for him who will not find time to provide food for his horses and cattle.

So much has been done of late years in introducing and propagating hardy varieties of fruit, that the area in Ontario is very limited, over which many kinds of fruit, especially the smaller varieties, cannot be grown. As in other things, we may expect occasional failures in fruit-growing, but by intelligent management these become rare.

To make fruit growing on the farm a success, the first thing to be considered is the selection of a suitable piece of ground. This should be the choicest on the farm, well drained, if possible convenient to the house, and sheltered from the prevailing winds by a wind-break, natural or artificial. In shape it should be longer than broad, admitting of rows sufficient in length for convenience in cultivation with the horse One hundred yards long at least. The extent of ground devoted to fruit may vary according to requirements. From half to one acre in small fruits should supply the wants of an ordinary family.

In selecting the kinds and determining the number to plant, the aim should be to provide a succession and abundance of fruit, fresh or preserved, throughout the year.

Although not, strictly speaking, a fruit, that which first answers that purpose in spring, and gives us a heathful foretaste of sweeter things to come, is rhubarb. This is easily grown, and twenty-five or thirty plants planted two feet apart in the row will yield all that is desired.

Strawberries are best grown in rows three feet apart, plants set one foot apart in the row and allowed to spread, forming a matted row one and half feet wide, to which they must be confined by repeated use of the cultivator. One row each of the following varieties will make a collection that will give, in a favorable season, a succession of fruit for a month, viz., Crescent, Wilson, Captain Jack and Manchester. Many new and excellent varieties are being introduced, and in localities where these succeed may be grown instead of those named. A new plot should be set out every second spring and the old one plowed up, as less time is required to plant a new plot than keep clean the old one.

Next in order come raspberries. These may be planted three feet apart, in rows six feet apart. They begin bearing a couple of years after planting, and if kept well cultivated and properly trimmed will bear good crops for a number of years. The terminal buds of the new cane should be nipped back during the summer when two or two and half feet high, causing them to grow stocky and throw out lateral branches, that they may stand erect and bear heavily. In the fall, after fruiting, the old wood should be cut out, and but four or five of the strongest new canes left. In a good season, with suitable varieties, the fruiting season of raspberries may extend over a month or six weeks. The reds are most desirable for preserves or jams; the blacks for canning and pies; while some of the varieties of the yellow are beyond comparison for eating fresh. A mixture of the three makes a delicious ornament for any table. We would suggest a row each of the following varieties: Red—Marlborough for early and Cuthbert for late; black—Souhegan for early and Gregg for late; yellow—Golden Queen.

Nor should the farmer's fruit garden be without a row of gooseberry or currant bushes. These may be planted the same as raspberries. Though perhaps not so much in their season as rapberries and strawberries, still we remember from experience that these fruits, in the form of currant jellies and gooseberry jams make the most interesting portion of a schoolboy's lunch.

The currant bush should have its new growth cut back every spring one-half and kept somewhat thinned out, while the gooseberry needs only the annual thinning out of old wood. For varieties to plant we would recommend the following: Currants, red—Raby Castle and Fay's Prolific; white—White Grape; black—Lee's Prolific. Gooseberries—Smith and Downing.

The large blackberry, though not grown nearly as much as it might be, yields large crops of fruit, ripening in August. Some dislike growing blackberries on account of the sprawling growth of the canes and the tendency to spread by suckers, but by cutting the canes back in summer to three feet and using the cultivator freely these objections may be overcome. For home use one row of these will be sufficient. Kittatiny and Taylor are favorite varieties.

Grapes should be planted about ten feet apart, in rows about the same distance apart, and trained upon a trellis as soon as possible. In the colder parts of the province the vines have to be taken off the trellis and laid down for winter protection. Where this has to be done the renewal system of pruning is perhaps the most convenient, but where winter protection is not required we prefer the Kniffin system. Twenty-five or thirty vines, of several of the best varieties of each color will be none too much for home use, especially if there are a few rising hopefuls in the family. In varieties we would recommend the following: Red—Delaware, Lindley and Brighton; black—Moore's Early, Worden and Concord; white—Niagara and Lady.

Peaches are out of the question with most of us, except those living in the more highly favored parts of the province. We all, however, can grow cherries, plums, pears and apples, and it is needless to say should have varieties of each to provide a succession of these fruits sufficient for home use. Time will not permit us to speak of the management of each in detail, but in conclusion would offer a few general suggestions bearing on these and most other fruits.:

1. Cultivate thoroughly and repeatedly on heavy soils, if possible after every rain. Surface cultivation is preferable.

2. Apply fertilisers liberally, but withhold farmyard manure where growth of wood is at the expense of fruit. Wood-ashes and bone meal are specific fertilisers for vines and trees.

3. Prune every year without fail. Trees, currant and gooseberry bushes are best trimmed in the spring when coming into leaf; vines and berry bushes in the fall after fruiting. The stone fruits, cherry, plum and peach, require very little pruning.

4. Keep a vigilant watch for fungus disease and insect enemies. Prevent attack of grape and gooseberry mildew with sulphur. Check apple scab with Bordeaux mixture; Wage war on codling moth and caterpillars with Paris green. Capture the curculio in sheets. Commit to the flames pear blight and black-knot.

5. Do not expect an abundance of fruit without diligent and intelligent effort, but rest assured that, with these, the fruit garden will give more pleasure and profit than any other equal area of the farm.

HOW TO MAKE FARMING PAY.

By Simpson Rennie.

To make farming pay, three things above all others must be considered, and these are —1st. The removal of surplus water. 2nd. Keeping up the fertility of the soil. 3rd. The destroying of all foul weeds.

In the first place, if any of you have a farm that is too wet for the full development of the various crops usually sown, I would say by all means have the water removed, and I know of no cheaper or better way to do than that by underdraining. and there is no better material for that purpose than drain tile. Some of you may be ready to say, I can't afford to drain. Now, if any of you have wet fields on your farm, I would say, you can't afford to farm and not drain. In these times of close competition we cannot afford to pay, it may be, both rent and taxes on land that will yield little or nothing. While seeding on my own farm some 35 or 40 years ago, before any draining was done on it, it was no uncommon thing to see the horses spattered to the very backs with mud and water, and to have the mud removed from the horses' bodies and legs they were forced to wade through ponds filled with water before going to the stable, both noon and night. But underdraining has changed muddy fields and frog ponds to a thing of the past. I can safely say, in the province of Ontario there are hundreds of acres of land left unplowed this fall on account of being too wet, or rather for the want of being underdrained. Now, suppose next spring is a wet and backward one, and these wet, unplowed fields that I have just mentioned have to lay in that state until the end of next May before they can be sown, the result will then be partial failure. Then we farmers are apt to say the times are hard, markets are low, and the grain is not turning out well; but we seldom blame ourselves. The lumbermen put sound logs into the millpond, and why so? That they may remain sound They know that by placing them in the water the air is excluded, and no change will take place; but how different where we want to grow grain. The air and light are required to act on these particles of earth before they become food for plant growth. Why, then, allow your broad fields to lie for weeks in the spring filled with water and destroy all plant life when it is so easily removed by underdraining? By so doing success is sure to follow: or, as the *American Agriculturist* has it, draining and good tillage lie at the base of profitable farming. Now, how can we till properly unless the land is drained? I know that a good deal of underdraining has been done throughout Ontario, but a great deal more could be done with profit.

Secondly. To make farming pay we must keep up the fertility of the soil. We cannot afford to grow grain year after year and put back only the straw to grow the next crop. And some don't do even that. We might as well expect a large flow of rich milk from cows fed on straw alone as to expect a large yield of plump grain from land manured with rotten straw. I hold that to continue growing grain we must give back to the soil an equivalent in plant food to replace that which is taken up in the production of these crops. Now, to do this we must keep stock; yes, sufficient to consume a good portion of the grain raised on the farm. It is not for me to say if you are to go into breeding, feeding or dairying. Some may have a natural gift for one of these and not for them all. We are most likely to succeed in that for which we have the greatest liking. Some will ask, will it pay to feed grain to stock? I can safely say, where we are far from cities or towns and have no other source from whence we can get a supply of manure, unless from feeding stock, it will not pay to farm unless we feed a good portion of the grain raised to keep up the fertility of the soil. We are apt to forget the grain at the ordinary market price and fed through cattle is worth at least 25 or 30 per cent. of the whole cost for manure. Now, I will ask who are the farmers that have been crying out hard times? Is it those that have been feeding grain to their stock for years? No, not a bit of it; it is those who have been growing grain, selling it, and the yield getting less year after year.

Thirdly. It matters not if our land is drained and the soil enriched with manure if we allow the weeds to multiply. Disappointment will soon be the result. Just think of a farmer cultivating, harvesting and threshing a crop that is nearly one half weeds. This will cost to harvest and thresh at least $3 per acre; then it is clearly seen that any person farming in this way will have to expend $15 for every ten acres harvested (that is for weeds alone), and there will only be left half a crop of grain, which in these times of moderate price will pay no farmer to grow. Often summer-fallow is resorted to to rid our fields from thistles or weeds, and how is this usually done? I can safely say that in six cases out of every ten the land is only sufficiently stirred to ensure a greater growth of weeds the next year. Then, again, many of us (instead of summer fallowing) grow roots, which answer a double purpose—that we may have roots for our stock, and at the same time clean our land from foul seeds. But, alas! how often do we see the roots harvested, with the land in a more foul condition than at the time of sowing. I have known some to look with a longing desire to see those good old times return with waving fields of golden grain; but, gentlemen, we have robbed our land of its fertility by growing grain and giving little back in return.

To make farming pay mistakes must be guarded against, such as extravagance in the purchase of implements or thoroughbred stock, or neglect in the caring for these; but the main principles to ensure the farmers' success are, as I have already stated, underdraining, manuring and destruction of weeds.

Now, let me say in conclusion, if any of you have a farm, and any portion of it is too wet for the full development of the various crops, by all means drain it. Look after the supply of manure, so that you may be able to replace those elements taken out of the soil by growing grain and other crops. And lastly, unless the myriads of weeds are destroyed, the farmer will be robbed of his labor; but with these things properly attended to success will surely follow.

DOMINION EXPERIMENTAL FARMS.

Prof. Wm Saunders, Director of the Dominion Experimental Farms, Ottawa, Ont., gave a most interesting address upon the above subject. His remarks were most highly appreciated by all present, and especially by those closely connected with Agricultural College and Experiment Station work. A very hearty vote of thanks was tendered Professor Saunders for his most worthy address.

WINTER DAIRYING FOR ONTARIO.

By G. Harcourt, B.S.A., '89.

The first question which naturally arises in our minds is, "What is winter dairying?" That term is now so well understood that an explanation of it seems hardly necessary, yet for those who may not know we would say it means, briefly, having cows give their heaviest flow of milk during the winter instead of the summer.

It may then be asked, Is this a wise change to make? Can milk be produced better in the winter than in the summer? What about our severe winters when the cows have to be tied up in the stalls and fed for six months? The easiest way of answering some of these questions may be by showing what we have been doing in the past, and in many cases are now doing. It is best to deal with facts, for then there is something to rely upon.

We find that the dairy business is one of the oldest in existence, for we read that once when Abraham entertained visitors he set before them butter and milk. From this we would infer that they had a knowledge of butter making in those days. From this time on the milk of the cow has been used as a food for man, not to say anything about milk from camels, mares, goats and sheep.

The average yield of milk given by the cows of our province is in the neighborhood of 3,000 pounds. This seems to be the amount a cow naturally has the power to produce. Man, however, by his intelligent management, can develop that power so as to increase the milk yield, for the improved dairy cow, if we may use such a term, is essentially an artificial production of the judgment of man. Those qualities which make her valuable as a dairy cow are a development of her original inherent function, the result of the exercise of human intelligence and judgment. The large udder, the big milk yield and the lengthened milking period are simply a development of the natural functions of the cow. This development has been brought about by careful selection in breeding and judicious feeding. Man is developing these functions to their utmost capacity. He must, however, continue to use his skill and judgment to preserve these powers and prevent their deterioration. It is an acquired habit, and unless closely guarded will be lost. The cows that give such big milk records have been developed in this way; denied the feed and attention given them they would soon be nothing more than ordinary milkers.

All our cows have not reached this state of perfection. The great majority of them are not as much improved on nature as they should be, for there are hundreds of them throughout this province which, if given proper treatment, could be developed to give from six to eight thousand pounds of milk yearly. The material is there; what is wanted is the skill on the part of their owners to develop their powers by judicious feeding and care. In many sections of the province, especially in cheese dairying neighborhoods, the most of the cows commence their milking period in the spring and as early as possible the milk is sent to the factory. On good pasture in the spring and early summer the cows give a heavy flow of milk for a time, but as the dry weather comes on and the pastures begins to dry up, the cows commence to dry up too. A man of forethought has now ready a field of green feed to supplement his pasture, and thus prevent a serious shrinkage in his milk yield. The general rule, however, is not to provide any such feed. No particular effort is made to keep up the flow of milk, and the resulting shrinkage is accepted as a matter of course.

Once the shrinkage takes place it cannot be repaired, for it is a well known fact that if you allow a cow to fail in her milk it is next to impossible to restore that failure. The extra food fed in trying to do this would produce much better results if fed as a preventive before the failure had taken place.

The cold weather in the fall causes another loss which should be guarded against. Cold, wet days and nights the cows should be in the stables. When the cows are tied up for winter the change to dry feed soon dries them up altogether, or they are giving so little milk it is not worth the trouble of milking, so are soon dried. The result of this shrinking process is that most of the cows are dry by the beginning of the year, and many long before this. This only gives a milking period of from six to eight months. The rest of the time they are boarding on the farmer, a thing he cannot stand in prosperous times, much less in a depressed time like the present.

A prominent breeder once said, "You feed and care for a common cow like a Jersey, and you will think you have a Jersey." There is a great deal of truth in this statement—more, perhaps, than we are at first willing to concede. Feed has always played a very important part in the development of any breed; combined with care, attention and skill on the part of the breeder, it constitutes the whole story. Were we to give our common cows the care, attention and feed we would a Jersey, we would soon have cows as serviceable to us as the Jersey. The opposite of this is equally true. You treat a Jersey as many men do the common cow, and you will have a common cow. The Jersey has been used to liberal treatment. Given this she will respond handsomely; deny her, and she will fail to respond. How are too many of our common cows cared for? It is not so very long ago that it was usual for a farmer to have to "lift" some of his cattle in the spring. If his cattle came through the winter and were able to get around themselves, he considered they had been well wintered. They were allowed to stand around the straw stack to keep warm. We are gradually learning that care and attention given to animals pays big interest—that it is cheaper to keep animals warm with lumber, tar, paper or stone wall than to feed hay and grain for that purpose, and that unless an animal is making some return for the food fed, either in the form of milk, growth or work, that animal is kept at a loss.

The objection is sometimes urged that so much care and attention make the animals tender and delicate. The desire is an animal that is tough—one that can rough it. This toughness and ability to rough it is, however, at the expense of the milk yield. Motherhood, the origin of the milking period, is a time when cows should receive the best of treatment rather than to have to rough it. The organs of milk production, set in action at this time, are most intimately connected with the nervous system, and require careful handling, but this careful handling will repay the trouble every time.

Such is the state of affairs in a very large section of the province, the winter months are largely months of idleness for both man and beast, consequently it is not to be wondered at that the cows commence the season's work in poor condition. They have been doing nothing for their board all winter, and as a result they have not been fed as they should be. It generally takes half the summer for them to make up for the poor keep during the winter.

The number of men who keep their animals in this way is growing less every year as our farmers are finding out a better way of doing. They have learned that ensilage makes a splendid food for milch cows, and that on it they will continue to give a heavy flow of milk equal to the flow given on good grass.

They have also found a decided gain by having their cows commence their milking season in the fall or early winter, milk all winter with ensilage as a food until the pastures in the spring are good. The grass then gives them a fresh start so that they will continue well into the summer with a heavy flow of milk. When the dry weather comes on the cows are nearly ready to dry up as they have put in a long season. By this way of managing they have found that they can double the milk yield of the cows. In the first place they make a gain of two or three months in the milking period, then the even continued flow on the ensilage makes another considerable gain, and the change to grass keeps up the flow during the summer. Every cow should milk at least ten months in the year.

Were such a change as we have just outlined, as followed by some of our leading dairymen, made by the farmers of our province generally, it would undoubtedly be to their best interest.

Corn for ensilage purposes can be successfully grown in almost any part of Ontario The silo is past its experimental stage; it is a success and has come to stay. As a food for milk production corn ensilage has taken a very high place. With it a heavy flow of milk can be obtained at a cheaper rate than on any other food. There is nothing to hinder every farmer having a silo and thus have good cheap food for his cows during the winter. A warm, comfortable stable may be a greater difficulty, but a little tar-paper and lumber will work wonders with an ordinary stable.

During the winter months the cows can get the needed care and attention that is denied them during the busy summer season. The farm work will be divided more evenly over the year. It will thus furnish work for the hired man. As to any evil effects that may arise from the animals being tied up all winter they have yet to be found. There are hundreds of animals tied up in the fall and never out until the spring. These animals do not suffer any harm from their long confinement. They certainly are much better in warm stables than rustling around the straw stack to keep warm.

Another decided gain arising from changing to winter dairying is seen in the improved appearance of the calves, and, ultimately, in all the stock. It is a well recognised fact that the fall or winter calf is always the best and will be ready for market six months earlier than its spring competitor. In districts where the milk is sent to the factory, if the cows have come in early, as soon as the milk is removed the calves commence to fail, even if extra pains are taken to prepare good substitutes.

The calves are too often turned out to hunt their own living on the pasture before they are capable of doing so. But their worst enemy is the hot sun, they are young and tender, and our hot sun is too much for them; better calves will be raised if they are kept inside altogether. The winter calf will have plenty of sweet skim milk; it soon learns to lick a little meal and eat hay, and when spring comes is in a condition to do well when turned out to pasture. During the winter there is time to give it the care and attention it needs, and which is almost denied it through the busy summer.

"Train up a child in the way it should go," is good advice for the human family. "Train up a heifer calf in the way she should go when she becomes a cow," is equally good advice for the stock-raiser. She "should go," first, in the way of utilising the whole of her food to make growth. She should be so reared that her digestive powers are not injured, and that when she becomes a cow she will be able to make the best possible use of the food fed her. If she forms the habit when a calf it will continue with her through life, and will likely be transmitted, to a certain extent, to her progeny. If, however, in feeding her when a calf, you injure her digestive powers by improper feed or starvation, you injure her for life. A stunted animal is a sink-hole for feed. Such a calf will never be able to make the same good use of her food as if she had been properly reared, and will not make a profitable cow to keep.

A strong argument in favor of winter dairying is that the price of butter in the winter is usually one-third to one-half more than in the summer. The object of every producer should be to produce at the cheapest and sell at the dearest rate. With ensilage as a food, milk can be produced in the cheapest way, the product is also of first class quality. So cheaply is it produced that many of our prominent dairymen are raising corn ensilage to feed their cows with during the summer instead of pasturing them.

The cheese season lasts only for six months. Why not put butter-making apparatus in the cheese factories and make butter during the other six months of the year? Such an outfit would cost about $200. There is no reason why such a plan could not be worked. The time is coming when these factories will be run the whole year round. For some reason the creameries have been on the decrease in Ontario; they do not seem to be as popular as they should be One reason for this may be the fact that the season is against us, most of the butter made in the creameries has to be held in store all summer until the cold weather in the fall before it is shipped to the old country markets, and, by this time, a great deal of it is old and stale. Such butter compares very unfavorably with the fresh butter from the continent, and hence we have gained for our butter anything but an enviable name. We can make butter that will compare favorably with the butter for sale on the English markets, but we have to proceed in a different way to what we are doing. We have gained a good name for our cheese, but how has this been gained? So long as we sent home made cheese to the old country we had no name for it, it was only when the factory system extended so that there was a large quantity of a uniformed kind sent that a name was made, and what is the result? Of the cheese we now send to the old country 99 4-5 per cent. is made in the cheese factory, and only 1-5 of 1 per cent. is home made. Our article of export is becoming more and more uniform as the influence of the cheese instructors is being felt. Our climate seems to be particularly suited to making cheese in the summer; for butter-making our summers do not seem to be suitable. There is no reason why we cannot make good butter during the cooler portions of the years, when we have not the heat of summer to contend with. The butter could be put up and shipped at once while fresh, it would then get to the old country market in a condition to compete. At present most of the butter sent from here to the British market is dairy butter. We will gain no name for our butter until we have it made under co-operation, *i.e.*, in the creameries. What we must have for export is a uniform article, not the miscellaneous mass which now goes under the name of butter. Creamery butter brings a higher price than dairy butter on account of its uniformity. There is a difference of four to six cents a pound. It is estimated that there are about 30,000,000 pounds of butter made annually in Ontario in the farm dairies. If this were made in creameries the increase in price would be no inconsiderable item, it would compensate us for some of the markets we have just lost.

It is thought that a change to winter dairying would not conflict with the cheese interests, but on the contrary would help them The scheme is endorsed by some of the leading cheese men of the province, who think it would give a great impetus to the cheese business instead of injuring it. Our cheese trade is growing to be a big one, but there is still room for plenty of development, as a great many of the counties have not a cheese factory in them, and many more with only one or two.

The dairy farmers have stood the hard times of the last few years better than their brother farmers. It is a sure business ; it gives room for development and calls for skill and talent of the highest order. The little country of Denmark, only one-sixteenth the size of Ontario, has as many cows, if not more. Its population is about the same, too, so we have in them an example we can't do better than to follow. To do that leaves us room for any amount of development. We have good land, land capable of carrying more animals to the acre than it does. With ensilage to feed and warm stables the winter is not the troublesome time it used to be, but affords a man the very best of opportunities to do good work, as he has his animals entirely under his control in a way he has not when they are out at pasture.

By building a silo and growing corn to fill it a man can double his present stock easily, he can do more as many farmers have done already. By changing to winter dairying he can double his milk yield. When there is room for such development why should we complain of hard times? If, by the exercise of a little thought and skill, we can double the returns from our present facilities, it surely deserves some consideration at our hands Not only can the yield and stock be doubled by introducing winter dairying and the silo, but if the silo were made a means of soiling in the summer the stock could be again greatly increased. Some of our leading farmers are doing this. These methods, by which some of our more energetic farmers have worked themselves to the front, are open to the rest of us if we wish to take hold of them, as a means to lift us out of the slough of despondency. We must intensify our farming by making what we have produce more at less cost.

While a man is making these changes with his stock and farm he will be improving himself. As he sees his stock grow and develop into more profitable animals under his guiding hand, his own mind will be growing and expanding, and he will be fast becoming a better man and citizen from the patience and care exercised in producing these results. He will also be a better business man from the necessary close attention he has paid to business principles in the successful working of his plans.

OUR HORSES AND HORSE MARKETS.

By F. C. Grenside, V.S., Veterinarian, at the Ontario Agr'l College.

The lecturer first drew attention to the present state of the horse markets, and compared their depressed condition with the boom in horse flesh, that began about twelve years ago, and continued until four or five years ago, since which time there has been a steady decline in prices. He accounted for the great demand and consequent high prices, which ruled for a number of years, particularly in heavy horses, as the result of the Americans, all at once, about the year 1880, conceiving the idea that their dray work could be more economically done with a much heavier grade of horse than they had been in the habit of using, so they came into our markets and bought very freely of our horses. Geldings with weight sold freely to put into work, but there was a particular demand for mares from the breeders of the western States.

About the same time the Canadian North-west began to develop and this gave rise to another enormous demand for anything with weight. The Americans in addition to importing all the mares they could get from us, were very heavy importers of draught entires, and they went at breeding with a will, in fact to such an extent that it soon began to tell on the market, causing the prices to come down. Up to last year we were still, however, shipping a good many horses to them, but at much lower prices latterly than formerly. Then last year the McKinley bill came into force, with its increased duty, practically shutting us out from that market.

Attention was drawn to the fact, however, that even if there was no duty to pay on horses entering the states, prices for work horses would still range low, as horse flesh has declined so much in value in the States, the result of enormous production in the west.

In the Canadian North-west horses are being bred in sufficient numbers to supply their own demand, so that, that market is also shut off from us, leaving us nothing but our home market, and a market for high class light horses, and heavy dray horses in Britain.

High class draught and light horses are, however, so scarce in this country that they still bring a fair price, the former being used at home, and the latter can still be shipped at paying prices to the States in spite of the duty. It was pointed out that really good specimens of heavy draughts or light horses were not likely to drop to an unprofitable price to the raiser, because they could both find a good market in Britain. The question was then asked as to how horse raisers should proceed under the circumstances, and the following recommendations were made :

Those farmers that have scrub mares or mares that the chances are against producing high class progeny, even when bred to good horses, had better be left unfruitful.

Horse breeding is an inexact science, and even when good mares are bred to first-class stallions there will be sufficient medium or scrub stock produced for the requirements of the country, without proceeding in a course in which the chances are in favor of animals of inferior merit being produced.

One unfortunate outcome of the boom in horse flesh was that it made many breeders careless about selection, thinking that anything with draught blood in it would sell, so that draught horses were bred to all sorts of mares, which accounts for the enormous number of light draught scrubs there are in the country, and which there is no market for. Efforts should be made to breed the heaviest stamp of dray horse, as a good one of weight brings the highest price, and if there are any more of them than is required to supply the home market, they can be shipped to Britain at a profit. In the attempt to breed really heavy horses there will be enough produced of the light stamp to supply the light draught demand.

With regard to light horses the lecturer stated that we had not made as much progress as we had in heavy ones, in the way of producing high-class animals. He thought that our light horses were lacking in *quality*, *style* and *symmetry*, and he suggested as a means of improvement the infusion of more thoroughbred blood, which, when crossed with our common mares of medium weight, and that are not too coarse, would be likely to produce either carriage horses, roadsters, or saddle horses. Most of such half breds if bred from mares of substance, would also be general purpose horses, and do their share of the farmers' work, while they were being trained and developed sufficiently to put in the market.

In addition to this the thoroughbred blood in the mares, would lay a good foundation to cross with coach horses, hackneys, and standard breds for the production of harness horses of quality, style, symmetry and action.

The good sound horses that are bred in this way, will never be a drag on the market, for all our surplus stock can find a ready sale either in Britain, or the United States, the tariff not being sufficiently high to keep us out.

THIRTEENTH ANNUAL MEETING

OF THE

AGRICULTURAL AND EXPERIMENTAL UNION.

The thirteenth annual meeting of the Ontario Agricultural and Experimental Union opened at 10 a.m., January 28th, 1892. The president, Elmer Lick, Oshawa, Ont., occupied the chair.

The minutes of the meeting were read and approved, and after the various committees had reported, the President gave the following address:

PRESIDENT'S ADDRESS.

GENTLEMEN,—Again we meet in the capacity of the Ontario Agricultural and Experimental Union. Swiftly has the year 1891 passed by with its successes and failures. Already we have advanced considerably into the year 1892. When we realise how swiftly time passes, and consider our position as farmers, students, and ex-students of the Ontario Agricultural College, and when we also consider the serious nature of the competitions against which we have to labor, we are brought to the stern necessity of assisting ourselves in every way possible.

Other countries are striving to supply the same markets on which we rely, and it is only by careful, thorough, systematic work that we can expect to keep the markets we already have. We must experiment in the best ways of marketing our products, so packing, grading and labelling them that they shall go on the market in the best possible condition. Experimenting in marketing is, as I take it, not in line with the work which can be most thoroughly and profitably carried out through the Experimental Union. However, it is work that needs looking after, and work from which valuable results may be expected.

We have to face the serious matter of a largely impoverished soil in many of the older districts of the province. We are in need of more thorough and energetic work in the endeavor to conserve the remaining fertility of the soil, and by careful experiments suggest such improvements in the practices on such soils as will increase the fertility of the land.

Sometimes I think the time is almost at hand when co-operative work in these lines would be useful; then again I think it doubtful if such experiments could be made of any practical benefit.

We also have the matter of weeds to contend with. Here we need co-operation, not by a few members of the Experimental Union, but by every farmer throughout this Province. Co-operative work under direction of the Experimental Union might be made profitable in determining the best methods of destroying various weeds. Again we have fungus and insect enemies to contend with. There is not a single plant that the farmer desires to grow but what is more or less seriously retarded in its full development through attacks by one or more of these. Experiments might well be undertaken under proper direction to settle the best methods of reducing loss from these causes.

The above are the principal competitors, common to all farmers. The Experimental Union has so far, with the exception of fertiliser experiments, attempted but little in the above lines. Most of the work would of necessity be individual, and could not be made largely co-operative. Here is one direction in which our Union so far has failed. I refer to the collecting of individual experiments with their successes and failures. This branch of our work needs emphasising.

My predecessors in office for the last two years have referred to the *O. A. C. Review* and urged advisability of closer relations of our society with the *Review*. I would suggest that an endeavor be made to secure as many results of individual experiments from ex-students and others, and that such be published in the *Review* at any time when received.

As an organisation the Experimental Union has been in existence twelve years, the Government has given grants commencing with $50, and during the year of 1891 the liberal sum of $400. The people in general, and farmers in particular, have a right to know whether we are a benefit to the country or not, also whether we are giving good value for the money with which we are entrusted. I desire individually and also officially to boldly say, that the Experimental Union is a benefit to the country and also that the money is economically handled, giving results in value far surpassing the expenditure.

(1) The Experimental Union acts as an advertising medium, assisting in filling the Agricultural College. It does this in several ways. The fact of an ex-student returning to a Union meeting awakens interest in immediate community. The various circulars sent out in connection with experimental work develop inquiry. The experiments themselves have a tendency in the same direction.

(2) The experiments conducted give results of value to farmers in general. One experiment in a neighborhood tends to awaken interest, farmers begin to enquire, "what fertiliser shall I use? Do I need one? Is there a better variety of oats, peas, wheat, barley, mangels, turnips, carrots, corn or potatoes than the one I have been growing?" Failing to find satisfactory answers to these questions from records of experiments, they begin to experiment on their own account.

(3) The various grains, etc., sent out have in many cases turned out to be varieties far superior to those grown in the localities to which such have been sent.

Other advantages might be mentioned. but I think enough has been said to convince every fair-minded man that the Experimental Union is worthy of the assistance it receives.

What the principal idea was when the union was first organised I know not. However, I do know that for a number of years college management seemed to be one of the chief subjects for discussion. In consequence of this the Union did not prosper as it otherwise would have done. Mistakes have been made in the past, probably mistakes will still be made, but let us learn by past mistakes to avoid the same ones in the future. Let us one and all work energetically and determinedly until the Agricultural and Experimental Union shall be known world wide as the foremost organisation conducting co-operative experiments.

To attain this end we need to be careful in our reports, be sure of all dates, weights, and facts having the slightest bearing on the accuracy and completeness of the report. Let us take hold with a determination to assist our neighbor or neighbors, being assured that in so doing we are doubly assisting ourselves.

QUESTION DRAWER.

Q.—Is is advisable when a person has three or four fields for pasturing milch cows in, to change them from one field to another, or to let them have access to all fields at all times?

G. A. Brodie—Changing them from one field to another would be an advantage, as, if they were allowed access to the whole there would be a great deal more tramping done.

Mr. Buchanan—In the Old Country they think it is a decided advantage to hurdle their sheep, and I do not see why the same principle will not hold good in the case of cows.

Q.—Is it advisable to breed mares in the autumn rather than in the spring?

Mr. J. Sleightholm—If this can be accomplished, I think it would be answered in the affirmative. Doubtless the spring is the most suitable time, but now, when horse flesh is so depreciated in value, it must be done when we can get the most work done, and that is by having them dropped in the fall. More attention can also be given at this time, and therefore a better foal will be the result. By storing ensilage, etc., we can have summer fodder in winter.

Mr. BUCHANAN—We have done a little at this, and, though there are a great many opposed to it, if it can be accomplished I believe this is the time to have the foals drop, but there is a difficulty to get the mares to hold at that season. Some hold that nature is suited to spring.

Mr. CARLYLE—We have tried to breed in the fall, but so far have not been successful. Some of our neighbors have tried it, but the two-year-old fall-bred ones are not much better than the eighteen-months-old ones bred in the spring.

Q.—What is the best roofing for a barn?

Mr. CHASE—We never use anything but shingles in Nova Scotia, but they do not last more than from ten to twenty years.

G. A. BRODIE—In York county there are several barns with metal roofs—a kind of zinc. They like it very much. It is more expensive than shingles, but those who have used it claim that the difference between the price of the shingles and the price of the metal is made up by the difference in the insurance in about four years. It requires no skill to put it on.

Mr. BUCHANAN—A paper roofing—a thick tarred paper—is used to some extent It is put on and then tarred over. They also claim that the difference in cost is made up in a short time by the lower rate of insurance charged.

Q.—Should silage be sweet, or is it of the nature of sour-krout?

Mr. HOLTERMANN—All ensilage contains more or less acid. Mr. Yuill thinks that many people do not handle their ensilage rightly, and therefore do not get the results they might get. When not sufficiently mature it would sour more than when put in at the proper time.

Prof DEAN—I visited a number of silos in the eastern part of Ontario. Mr. Daley of Newburg invited me to see his ensilage, which was laid in straight rows without being cut, but I did not like the result at all. He said his steers did not get much else, however, and I must say that they looked well. The difficulty, I think is in getting it pressed down tight enough. Mrs. Jones cuts hers into about quarter-inch lengths. When they cut it in the silo it did not seem to spoil at all, as is the case with ours at the College. That was the best ensilage I have seen, and the sample with corn in it pleased me very much. One man doubled his number of cows since he commenced using ensilage.

Q.—What effect has the feeding of silage on the product of the cow?

The PRESIDENT—I have only had about three weeks' experience with ensilage but am satisfied with it. Was feeding turnips before commencing the ensilage, but they tainted the milk. After commencing the ensilage the milk tasted different—like the product from grass.

Q.—Will the milk keep as long from ensilage?

Mr. HART—The degree of acidity in silage depends on the maturity at which the corn is cut. It should be cut when the stalk is beginning to get yellow and the grain a little glazed. In Alabama they use ensilage and get from 27 to 40 cents a pound for their butter. At Ottawa we put in some silage cut green, and it was sour but the cattle liked it very well, and there was no disagreeable flavor about the butter. Our long single moulded a little, but it was used to divide the different varieties of corn. You might allow it to get too dry and it would therefore mould.

Mr. HOLTERMANN—About silage affecting the product of a cow, I may say that Mr. Yuill said some parties who sent milk to Montreal got into difficulty with their customers when they began to use silage, but it was because they left their milk in the stables over night and the milk absorbed the odor from the silo; but when they kept their milk in a proper place this difficulty disappeared. Mr. Yuill gets 25c. per pound during the whole year for silage butter.

Q.—What method of preparing land for winter wheat is best under ordinary circumstances?

Mr. SHANTZ—The best method, as we have found it, is by bare summer fallowing; but the clause "under ordinary circumstances," somewhat modifies my view. You can get the best crop by summer fallowing; but I think we will have to change pretty soon and prepare the land after peas or barley. We can no longer afford to have the land lie idle for a whole season.

G. A. BRODIE—Summer fallowing has gone out of practice with us in York. After getting the hay off, they manure the land and plow very shallow, allow the sod to rot. Plow again later, and work it up for wheat. Corn and roots are used in place of fallow.

Q.—Which is the more profitable, the raising of light or heavy horses?

Mr. BUCHANAN—We raise heavy horses; but I think there is not very much money in raising either at the present time. There is at present a more brisk demand for a horse of the light stamp filling the general purpose bill, weighing about 1,200, of suitable style and of light get-up. I think Hackneys are about as good as any.

President MILLS—I think that by crossing a pretty good sized well-bred mare with a thoroughbred a good product will be got.

Mr. HURLEY—We have bred standard horses but are going out of them. I think Hackneys are preferable.

Mr. CARLYLE—In crossing a Clyde or Shire on a common light mare, you get scrub stock. Get the right class of mares, and cross with a thoroughbred stallion of the heavy stamp, and you will get a horse that there is always a market for. There is money in light horses—from Clydesdale crosses and thoroughbred horses.

Q.—Does it pay to breed horses of any kind at present?

Mr. KENNY—Yes; two kinds. The one is the heavy draught horse that hardly any person raises, for dray work and heavy work in the city—one that will go from 1,700 to 2,000 pounds. There are too many mongrels. The other class is a good carriage or saddle horse. Aside from these two classes, I do not think there is money in horse raising at the present time.

President MILLS—Is there not a danger of the farmers going out of it and then the demand coming up?

Mr. KENNY—I think so.

President MILLS—How would you breed light stock, Mr. Kenny?

Mr. KENNY—You have got to have a good class of mares, of the proportion that you want the offspring to be. The horse should stand from 15¾ to 16½ hands high, and you do not want mares under that size to breed from. You should find out what the grandparents were; for it is possible to get a good horse that will bring poor offspring—resembling the grandparent.

Mr. CLARK—I believe there is money in both heavy and light horses if you raise the best; but if you go it on the cheap principle, you will find them both unprofitable.

Mr. BUCHANAN—I believe we should go slow in breeding horses. There are parts of the Province now where good horses are bred and suitable prices cannot be obtained.

Mr KENNY—I advocate breeding a perfect horse—his legs to correspond with his body, and his body with his legs. The market for horses is becoming less every year; and when the electric cars come in use the demand will be still less. In the cities the light and real heavy horses will be used.

Mr. CLARK—It was said when railways came that no horses would be required but the market was as good after as before; and I believe the same will be true in regard to the electric cars. The horses will be wanted a little further out for other purposes.

Mr. MARSH—What are we to do with our mares that we now have, as they will neither raise the real heavy nor the light horse?

Mr. KENNY—I believe in breeding what you want for yourself, but I do not advocate breeding for market from the class of mares that we have at present.

Prof. DEAN—Suppose I can buy a horse for $75 or $80, will it pay to buy or raise?

Mr. BUCHANAN—John McMillan, M.P., says an ordinary colt will cost you at three years old about $100.

Mr. KENNY—A poor man raises a pig; he buys the food along by degrees, and at the end of a few months he has a pig. Whereas, if he had to pay the cash in a lump at the end of the time it would be much harder. It is the same way in raising a horse.

DAIRYING FROM A FINANCIAL POINT OF VIEW.

BY S. P. BROWN, WHITBY, ONT.

It is a pretty well recognised fact that there is more money to be made at dairy farming than by grain raising; but what branch a man shall follow is for each to decide for himself. In order that one may be successful, financially or any other way, the first necessity is decision of purpose; so in this dairy industry, it is necessary to decide what line you are going to follow; the production of milk, cheese or butter.

Having decided upon the branch you are going to follow, the second necessity is to get the very best cows for the purpose and breed them with the one object in view. Get stock that will give the greatest returns with the least cost. The breeding for milk and cheese is practically the same, as both the city milk vendor and cheese maker require the milk to be of good quality. There may be considerable difference in breeding for these and for butter. In the first two cases you want quality but especially quantity, and in the last case you want especially quality. Now, for butter making, if one can breed a grade of cows which will produce on an average two pounds of butter per day for ten months, we do not care very much whether she gives it in ten or twenty quarts.

We should grow those crops which would either supply most of the food we required or which could be exchanged for food which would suit our purpose better or cheapen the cost. We should study the nature of each individual cow in the herd in order to ascertain her requirements to produce the greatest profit. Having these necessities in our minds, except in case of the latter, which can only be gained by degrees and then with uncertainty; the next is to exercise the greatest of patience. The cows must be handled very kindly, even though they should kick or go astray; because any abuse will lessen the flow of milk. It takes but very little excitement to cause a decrease in both quantity and quality, and all these littles cut down the profits. The influences to lessen the product are much more marked when cows are fed to the capacity for their best production; hence the greatest care should be exercised to remove all these influences, for it is only by so feeding and handling that dairying can be made a financial success.

Another very important point in the butter industry is the marketing of the product. As for cheese, there are Boards of Trade having experts all over the Dominion to handle the product from the factories, but in the case of butter, such is not the case; in consequence of which the 75 per cent. which reaches the storekeeper is almost useless owing to improper handling. This is not the end of improper care. Such a merchant has no place to keep much of a supply, and has no more business with it than with cheese, so let him get it in the same way. As a result the sales from such a merchant are ten or fifteen cents per pound less, the year round, than the farmer should obtain for the butter were it properly handled, making the loss to the whole Dominion amount to the millions. We want Boards of Trade to handle it properly.

APICULTURAL EXPERIMENT.

The experiment conducted was, testing to what extent, if any, the bees thin out the septum, or base of comb foundation before storing the honey in the comb, and what effect various thicknesses of foundation has upon the thickness of base finally left by the bees. The object of this was to see if heavy grades of foundation would leave an undue amount of wax in the comb, making it unpleasant to the consumer, and injuring the sale of comb honey ; or if it might be drawn out into the cell walls by the bees. The foundation was supplied free of all charges to the ones agreed to conduct the experiments. There were three grades sent out, being six feet to the pound, ten feet to the pound and twelve feet to the pound, known as medium brood, thin surplus and extra thin surplus. The sections were marked accordingly before putting into the hive, and instructions given to place all over centre of brood chamber to give all an alike favourable position or otherwise for drawing out and building on the foundation. Owing to the very unfavorable honey season generally, some were unable to get the foundation drawn out at all. These we hope to secure next season. In testing for sections which had the thinnest base, the three samples were taken without looking at the number of feet per pound marked on wood, and by looking through base of section and taking a piece of each comb in mouth, the order of thickness was found, and in almost every instance the order was the same as when the foundation was placed in the sections. In no case was the least difficulty experienced in discovering that the foundation six feet to the pound was the heavier—the base and also the wall was heavy, and the feeling, when eaten with honey in the mouth, decidedly unpleasant. In No 8 experiment a heavy honey flow was secured artificially, by putting a feeder on top of the hive, holding about fifteen pounds, and the bees built the comb out very quickly. In this lot, when the honey was extracted and the wax was cold, the cell wall built on by the bees was broken away, and underneath the foundation was found in almost, if not exactly, the same condition as when put on in the sections. The general results tend to show that comb foundation in sections is not thinned by bees as is generally supposed. Twenty-four applied for material, out of which the following number reported, as follows :

By whom conducted.	P. O.	Honey flow.	Order of thickness.			Remarks.
			6 feet.	10 feet	12 feet	
1 Dr. Geo. Duncan..	Embro	Light. ..	1	3	2	A scarcely perceptible difference between 2 and 3.
2 E. L. Goold & Co..	Brantford ..	Medium.	1	2	3	
3 Geo. E. Adams....	"	Medium.	1	2	3	
4 Wm. Mowbray	Sarnia		1	2	3	
5 Edgar M. Husband	Cairngorm ..	Medium.	1	2	3	
6 Miss F. H. Buller.	Campb'lford		1	2	3	
7 Wm. German......	Beachville..		1	2	2	
8 R. F. Holtermann.	Brantford ..	Heavy ..	1	2	3	A very marked difference.
9 George Barber.....	Hartford ...	Light ...	1	2	3	
10 S. Rightmeyer.....	Wooler.....		1	2	3	
11 A. Haight.........	Wellington.	Medium.	1	2	2	
12 Jas. Shaw.......	Kemble	Medium.	1	2	3	

EDGAR M. HUSBAND,
A. HAIGHT, } Apiarian Committee.
R. F. HOLTERMANN,

FOUL BROOD GERM (*Bacillus Alvei*).

Mr. R. F. Holtermann read a communication from the Provincial Board of Health, Toronto, in regard to the foul brood germ (*Bacillus Alvei*), the vitality of which is now being tested for this Association by Mr. John J. Mackenzie, Toronto. This test will settle the question as to what temperature is required to destroy the bacillus. Other points in connection with "foul brood" will be tested and the results reported upon in due time.

A. Pickett—Has not the temperature something to do with the production of comb honey?

R. F. Holtermann—I think it has, probably, but not very much; because in the production of comb honey you require a strong colony, and the temperature of a strong colony will not vary very much. If it is too warm, they will hang out and ventilate. In the production of extracted honey there may be something in the temperature.

Mr. Pickett—My experience goes to show that not only the strength of the colony but the temperature of the weather generally has largely to do with the use of the comb foundation. I think the thin foundation is equally acceptable with the heavier; and it does not create within the comb what is known as "fishbone." I think that twelve feet to the pound is about right.

W. F. Clark—Last year I used fourteen feet to the pound. My practice is to give them starters—all that is required is to get them started. In the section boxes, I should use the foundation just as light as I could possibly get it.

President Mills—Why do you prefer full sheets to starters?

Mr. Pickett—For the sake of obtaining a complete comb. If I have full sheets in the section cases, I am more apt to get a full section than if I only use the starters.

Mr. Clark—I think it all depends upon the honey flow.

Mr. Holtermann—I believe that, as we do not know what the honey season is going to be like, we should always arrange in such a way that when the worst takes place we will secure the best crop that the circumstances will allow. I believe that a starter would be just as good as a full sheet when the flow is good, but if the flow is poor we get a better finished section with the full sheets; and, therefore, I advocate the use of them.

Mr. Clark—Can you guarantee that the bees will make a better job with the full foundation than they will with merely a starter?

Mr. Pickett—My experience goes to prove that by having the full sheet of foundation we do not have those holes in the sides. If the honey is not coming in rapidly they form a thick coating of wax, and there is difficulty in getting them to fill it out again.

PROFITS OF WINTER DAIRYING.

By Joseph Yuill, Carleton Place, Ont.

There are certain requisites to be considered before winter dairying can be made a successful and profitable branch of the farm. Two things are principally essential, viz. plenty of women assistants and a good breed of dairy cattle. The cattle will require good warm stables with liberal feeding and proper care and management. Always aim to have your stable at a temperature of 60° F. or as near that as practicable. Let me impress you with the need of regularity of milking. The cow is an animal of habit and requires to be milked by the same person and very punctually every time.

We have found it best to have the cows come in during October or November. If there is a cheese factory in your locality, as soon as sufficient milk could be obtained in winter to make butter making profitable, I think your cheesemaker could easily be induced to fit up his factory with the proper appliances for making butter in winter and cheese in summer. If you feed your cows ensilage in the winter they will give a good flow of milk and keep it up nearly as well the next summer, as if they are allowed to run dry in the winter. I believe our butter will not take the place in the British market that our cheese does until it is manufactured in the creamery. It is my opinion, however, that the quality of our butter would be greatly improved if it was made in the winter and not as now, made in the summer. Although I believe strongly in the use of ensilage for dairy cows, yet I believe that winter dairying can be carried on successfully and profitably without a silo.

In March, 1889, we tested an average cow of our herd for seven days with the following results:

Her daily ration was:

50 lb. ensilage, at $1.50 per ton	3¾c.
5 " unthrashed oats, cut with cutting box, at $6 per ton	1½c.
2 " oats and peas chopped at 1c. per pound	2c.
Total daily ration cost	7¼c.
" cost for for seven days' feed	50¾c.

This cow gave 252 lb. of milk in the seven days, which yielded 12 lb. 10 oz. of butter. From this we see it required 20 lb. of milk to make one pound of butter.

We have just finished another test with the some cow. This cow was not the best in our herd, nor the poorest, but simply an average animal, and had been milking 110 days previous to the test.

Her daily ration on this occasion was:

10 lb. beaver hay at $5.00 per ton	2½c.
4 " barley meal at 1c. per lb	4c.
6 " peas, oats and barley, unthreshed, and worth $8 per ton	2 2-5c.
20 " mangels, at 8c. per bushel	2⅔c.
Total cost of daily ration	11½c.

She gave 201½ lb. milk in the seven days, which made 9 lb. 10 oz of butter. From this we see the cost of one pound of butter to be 8⅓c. for food. Last year our cows averaged $56 per head, after supplying the family and raising their calves.

S. Hunter—I have heard a great deal about winter dairying, and at Brockville the whole trend of the discussion was "winter dairying to make more profits for the farmer"; but if we have more dairying it means we will have more Sunday work. I am gathering Sunday work until my family are getting tired of it. You want to know whether you are able to attend to that sort of work before you commence it. There is not a man here but can make money if he tries; but we have only once to go through this world and I believe that we should have a little comfort. But am I to sacrifice my dairy interests altogether? Farmers are responsible for the food of the earth excepting the fish; and it is my duty to my fellow-men to make my farm produce to its fullest extent. The product of the cow is very important; and a person can live on milk alone to a good old age. Therefore, our interest in dairying should not cease. I believe the amount of Sunday work connected with dairying has a tendency to keep back that industry among us. Mr. Brown speaks in his paper about widening out butter making like the cheese industry. People say the butter market is overdone now. The only remedy is to get a better quality and send it out of the country.

R. R. Hunter—One way to overcome some of the Sunday work is to not enlarge your herd, but get the butter production of the individual cow increased.

S. Hunter—If I find that I can make a dollar pretty easy, and a little effort will make another, will I not make that effort—is it not human nature? My three-pound cows would become as numerous as my three-quarter pound cows.

Q. What is the profit in winter dairying?

S. Hunter—I am perfectly confident that there is profit in the business, but you have to be there every day and attend to it properly. My experience was $56 a cow one year.

Q.—What proportion of the year would you send your milk to the factory?

S. Hunter—Whenever the butter market gets down or the weather gets too warm, then turn to cheese. We ought to be in a position to make either cheese or butter any time of the year.

Mr. Kenny—I have known families that have been ruined by Sunday dairying. If you have not plenty of help you should let dairying alone.

President Mills—Will it pay to hire help?

Mr. Kenny—No; not as you can get it now-a-days.

Prof. Dean—If we get a proper milking machine, will that overcome the difficulty

Mr. Kenny—The great Being intended that that should be done by either the calf or the hand.

President Mills—One of the delegates from the old country, when here this summer, said that his brother had a machine which would milk thirty cows in five minutes. It costs about £1 to purchase machinery for each cow. This machinery is connected with the separator, which runs at the same time.

Q.—What do you think the four most important points to secure success in butter-making?

S. Hunter—In the first place, the dairyman as an individual is the most essential thing in the whole business. You must have a taste for the work—must like cows in every shape and form. In the next place, you must have a determination to attend to these animals thoroughly. We have got to be men that are willing to feed liberally. You have to keep a cow in a fair thriving condition in any case, and it is a little more added to this that gives the profit.

President Mills—Can you induce cows to eat more than they will digest?

S. Hunter—Yes; but it is not wise. I would rather keep the animal on the safe side.

Prof. Dean—Suppose a man were going to start in dairying, would you advise him to go into butter or cheese?

S. Hunter—To make the most of his cows he should be in a position to handle either butter or cheese, as the season or market would indicate.

President Mills—The average man is not in a position to do that, and some do not know whether to start a cheese factory or a butter factory.

S. Hunter—A cheese factory will take and hold its own against a creamery in the majority of places, for the reason that you need more education to make butter. If you send poor cream to a creamery, you get very poor returns; but if you send to a cheese factory, you get paid according to the quantity. We will have to breed and feed more for quality than quantity.

President Mills—You said you should feed and breed. Can you affect the richness of the milk by feeding?

R. Hunter—No; you cannot. I believe the quality depends on the breeding; but, still, I think that in time the quality of a cow's milk may be improved, but not at once.

Mr. Kenny—We sell milk in the city and feed our cows pretty liberally. When we run short of our own supply of milk and have to buy, our customers notice that a change has been made. If the difference is not in the feed, where is it?

R. R. Hunter—There are two limits to a cow in the line of improving her milk. If you buy a cow that has not been fed up to her constitutional capacity, she will improve in the quality of her milk until she is fed up to that point, but there she stands. You buy a cow that has been fed up to her full capacity, and you cannot improve her quality.

Prof. Dean—When we speak of quality of milk, and say you cannot increase the richness of that by feeding, what I understand is the per cent. of fat in the milk. What Mr. Kenny means is flavor. He feeds his cows rich food; and, as a result, the milk has a splendid aroma. Some milk has a richness not due to the per cent. of fat. I doubt whether you can increase the per cent. of fat in a cow's milk.

Mr. Kenny and Mr. Hobson agreed with Prof. Dean in his conclusions.

Prof. DEAN—I have a cow that will test 3¼ or 3½ per cent. of fat; and when her milk is set under the same conditions as the milk of another cow which tests about the same you will have about twice as much cream rise on the one as on the other. Therefore the amount of cream that rises is not always indicative of the amount of fat contained in the milk.

Mr. LINFIELD—At Markham, a young man who produces milk for Toronto customers said that feeding oil cake and other rich food he could increase the cream without apparently increasing the quantity of milk; but another man tried it with a Babcock tester and showed that the per cent. of fat was not increased. Henry Stuart says it can be increased in some cases.

FEEDING STEERS FOR THE BRITISH MARKET.

By JOHN McMILLAN, M. P.

I am somewhat taken by surprise this afternoon; but, as fattening steers is a branch of farm industry I have been engaged in for many years, I will try and give you the benefit of my experience.

The beef industry at the present time is a branch of farming that can be increased to a great extent in Canada. In Britain last year, the cattle placed on the market brought $44,000,000. The dead meat (beef and mutton) brought $126,000,000.

We purchase about one hundred steers each year and fattened them. And let me say that to be thoroughly successful in putting cattle upon the English market we have to buy them of the right stamp. We have great difficulty in buying cattle that pay us. After having experimented with grade cattle and with scrubs, I find that the same quantity of food that will put three pounds on a grade will not put two on a scrub. The animals that we ought to breed from for the purpose of beef making are those that will lay on flesh quickly. We must breed from animals of some beefing strain, because if you breed from a milking animal you will not get one that will lay on beef. The Durham and its grades are about the best; but the Herefords are very good if you are not going to stall feed them.

We purchased our steers at two years old, at a cost of $40 per head this year and $39 per head last year. We bought some in Manitoba and some in Ontario. I believe bringing cattle from Manitoba and feeding them here for shipment to the British market will in the future become an important branch of the beef industry of Ontario. When we get our cattle and put them in to feed, we want them with wide open nostrils, fine muzzle, broad between the eyes, clear, docile, intelligent eyes; straight from the horns back to the tail root; ham clean down to the gambols; full in the flank; straight bottom line; full behind the shoulders, which is one of the most important points, because British butchers will not purchase animals slack in that particular; ribs well sprung and barrel-like, presenting a square as viewed from behind and the same when viewed from the side.

I find that there is more in the man than in almost anything else in feeding animals. A man that will lift a hand to an animal can not feed any more for me. The moment they are tied in, if they are unruly, give them good care; as soon as you know what they are fond of, give them that to eat. In the last eight or nine years, we have never found a single animal but in three or four days the law of kindness would conquer. I have a grandson who had fifty head of cattle under his charge, but he got sick and we had to get another feeder. We got a man with good references and who had been three years with a farmer in this country, and my grandson stayed with him three days and instructed him how to feed and take care of the steers, but at the end of a month our cattle had gained nothing either in appearance or weight. Hence, the necessity of having the same person feed and attend to the animals at all times. Don't allow John to feed one day, Alexander another, and Robert the next. Let me say that no one is capable of going into a stable who has not learned thoroughly to control himself; and a man who over exercises any exhibition of temper among my animals I will not have. Regularity is one of the principal things.

We have sixty-eight steers, and they weighed between 1,200 and 1,300 lb. each when put up. We feed 18 lb. ensilage, 15 lb. cut straw, 2½ lb. meal, 1 lb. oats, 1 lb. peas and a little bran, the remainder being barley. We have found that barley is not a profitable food to give to animals to send to the British market. It is better to sell it and purchase other food. We also give 5 lb. mangels, 18 lb. ensilage, 15 lb. cut straw, and 2½ lb. meal; and we have never had our steers do better. Counting ensilage at $1.70 per ton, straw at $3, mangels 12 cents per bushel, and meal 1 cent. per pound, we feed our animals at an average cost of 7½ cents per pound. Let me say in this connection, that when we first began to feed we were under the impression that it was a necessity to feed from 8 to 12 lb. of bran. My system is to get the greatest results from the least possible outlay and trouble. As I said before, our steers do well on 2½ lb. of meal ration, but we may increase it to 3½ or 4 lb. In 1889, we took steers to the Old Country which did not receive quite 5 pounds of a meal ration during the winter, and they did well.

It is very necessary that, after you have your animals fattened, you should let them out to water and for exercise. We have fattened animals, having never let them out to water; but if the passage is rough, they get down and in consequence are bruised. You should let them out once a day; the shorter the better. If you have water provided in the stable, let them out for 10 or 15 minutes anyway.

If we excel and keep our position in the British market, we must pay strict attention to breeding; and our animals should mature at two years old. You can feed an animal just enough to keep it in a fairly healthy condition, without gaining or losing. That amount, say it is two per cent. of the weight of the animal, is a direct loss. Keep an animal till it is three years old, and there is an extra year's feeding for nothing. Then take a young animal when it is dropped and feed it as it should be fed till it is three years old and it will weigh 1,200 or 1,300 pounds; while one four years old, which has been allowed to run around the stack, will not weigh much more, and you cannot sell it for within one or one and a half cents per pound as much.

I think this clearly demonstrates that we should keep well bred animals and feed them well from the start, if we are to excel in this line of agriculture.

S. HUNTER—How do you tie your steers, and what do you stand them on?

Mr. McMILLAN—Our steers stand upon cedar blocks laid in sand, and a little coal tar is put on the top. There is a partition between the steers, and a long staple with a ring on it to which the steers are tied by the neck. We have double stalls, but there are posts between the steers so that they cannot hook each other. The stalls are 7 feet 4 inches for two animals.

Q.—Do you stand them on a slope?

Mr. McMILLAN—There is a slope from 1 to 1½ inches from the feed box to heels, and then a drop of 5 or 6 inches.

Q.—What time of the year do you ship your cattle?

Mr. McMILLAN—Sometimes in May and sometimes in June. Last year we fed 100 steers, and 56 of them were never out to grass, but the others were pastured. We found that it was better and more profitable to keep them in the stables. Two acres cut did as much good as three pastured.

Q.—How much did the animals increase in weight?

Mr. McMILLAN—In one month after being turned out on grass they had gained 98 pounds one year, and another lot gained 100 pounds during the same length of time. They got nothing but grass.

Mr. ROBERTSON—Do you believe in feeding a heavy ration of meal and then turning them out on grass?

Mr. McMillan—They will not do so well if you feed them a heavy ration and then turn them out.

Q.—How would you handle your cattle in raising them up to the time of shipping?

Mr. McMillan—We feed the calves three times a day, and grind two bushels of oats and one of peas, and teach them to eat as soon as they possibly will. We also keep roots in a box for them. Do not turn them into a poor pasture-field where there is no shed. In the fall we put them in during the cold nights and stormy days. Feed them through the first winter a suitable quantity of this meal—two or three pounds each—and a little clover hay. Do not turn them out too rapidly in the spring—perhaps two or three hours a day. We do the same with our steers the second summer. We have turned them off at 1,300 and 1,400 when they were two years and two or three months old, and these are the cattle that pay the best.

Q.—When do you turn from whole to skim milk?

Mr. McMillan—When about three weeks old. Never feed cold skim milk, but heat it to 80 or 90 degrees.

Q.—Do you find it profitable to take your steers to England yourself?

Mr. McMillan—We find it more profitable to take them ourselves. I believe it is worth $2 a head to be present when your own cattle are sold.

Q.—Have you taken bulls?

Mr. McMillan—Yes. They paid us about as well as anything we have taken.

FARMING AS AN OCCUPATION.

By James Mills, M.A., President O. A. C.

To farmers generally I wish to say that, notwithstanding all that has been said against farming, there are several particulars in which it will compare favorably with other occupations in this and other countries.

First, in the matter of *health*. Farmers have plenty of outdoor exercise; they also have fresh air to breathe, pure water to drink and the freshest and best of the earth's products to eat, all of which contribute largely towards the development of a sound mind in a sound body. And this is certainly a matter of much importance; for good health is one of the greatest blessings in this life. What is wealth, what are princely fortunes, stately mansions and the means of luxurious living to the emaciated dyspeptic or the confirmed invalid? For the sick man there is but little real happiness in this world. So the fact that farming is promotive of good health is a strong point in its favour.

Secondly, farming is clearly ahead of most other occupations in the matter of *independence*. Farmers have no customers, no clients, no patients to please. They may take sides on any question and express their views with the utmost freedom on politics, temperance, religion or anything else, and it will not in the slightest degree affect the growth of their crop or the price they will get for it when it is offered for sale in the market. It is not so with people in most other occupations. This also is a strong point in favor of farming as an occupation, because liberty is something of great value to any people, community, or individual. Most of the civilised nations of the earth have had to pay a great price for the civil and religious liberty which they now enjoy, and commercial liberty, liberty in all the affairs and relations of life is a great boon; so also is individual freedom or independence, such as the yeomen of this country enjoy.

Thirdly, farming will compare favorably with other occupations, even in the matter of *leisure*. The time is past, if there ever was a time, when people could make a comfortable living in any honorable occupation with anything less than persistent effort —we might say honest industry, or hard work. The successful mechanic, merchant, teacher, preacher, druggist, dentist, doctor, lawyer, etc., are all hard-worked men; and farmers, as compared with men in other callings, have no reason to complain, if they cannot succeed without close attention to business at all times and hard work at certain seasons of the year. They undoubtedly have to work hard, but no harder than successful men in most other occupations; and by a little forethought, they can generally without much injury to their business, arrange matters so as to have more leisure at certain seasons of the year, say in the months of January, June and September, than almost any other class of people in the country. When attending an exhibition, off on an excursion, or away visiting their friends, they are not worried by the thought that their absence may result in a serious loss of clients, patients or customers. They know what they have to do, and what their loss, if any, is likely to be.

But what about *money?* If there were more money in farming it would be more popular. If we could prove that farming is really a profitable business, we should find a large number of people anxious to become farmers. We admit that farmers cannot make money *quickly*. They cannot, by honest means, accumulate large fortunes in a short time. But the risk in farming is less and the certainty of success greater than in most other occupations. The great majority of the farmers in this country had no training whatever, either theoretical or practical, as a preparation for agricultural pursuits. Some of them were mechanics in the Old Country, some one thing, some another thing; but ninety out of a hundred of them had no special preparation for farming. They came to this country without either the means, the training, or the experience necessary to successful farming. They bought land, went to work, and blundered away; and, in spite of all their blundering, the great majority of them have been fairly successful. They have had plenty to eat, drink and wear; and notwithstanding all the mortgages, they are to-day worth more money, man for man, than any other class of people in this Province. So even in the matter of money, when everything is taken into account, farming does not compare very unfavorably with other occupations.

In view of these facts, there is certainly no reason why farmers should apologise for their occupation. If a man is "*only a poor old farmer,*" it is undoubtedly his own fault. There is nothing in agriculture to degrade any man. It is one of the foremost and most honorable occupations in this or any other country. Some thoughtless people are disposed to think of what we call the "professions" as more honorable than agriculture; but in this they are greatly mistaken. Agriculture is the only industry which the wealthy aristocracy of Europe does not think beneath it. The nobility of Great Britain would scorn the very idea of engaging in law, medicine, or any kind of trade; but they are all willing to be classed among the agriculturists of the country. Her Majesty herself has her farms, her herds, and her flocks; she takes a great interest in them, and is pleased to be ranked among those who till the soil of her vast dominions. And many of the tradespeople and professional men in the large cities of England are working late and early and saving money to buy land and move out into the country, in the hope that thereby they may gain social prestige and be admitted into a better class of society. Even in this Province, I am glad to say, no one is discounted socially because he is a farmer. If a farmer has ability, intelligence, culture, and refinement, the best drawing rooms in the country are open to him. Then let no one venture to apologise for agriculture, as if it were a low, degrading, or in any sense a poor occupation.

Two things, I think, the farmers of this country specially need, to enable them to take the position which their wealth and numbers entitle them to, viz.: *more taste* and *more education*. Because farmers are more independent than most other people, they often neglect little things which men in other lines of work have to pay attention to. Many of them are a little careless even about their toilet and clothing, not unfrequently annoying their wives and daughters by the appearance which they present when visiting their market town or village. This, you say, is a small thing. No doubt it is; but life is made up of little things; and any class of people who persistently neglect these little things, will surely bring themselves and their occupation into discredit in the eyes of the community at large. But it is especially upon the farms of this country and in the surroundings of home that there is room for a little more taste. There are many well-managed farms, and cozy, comfortable, and cheerful homes in this province; but there are many others of which we could not say so much. One cannot go very far in any direction without coming across crooked, tumble-down fences running zig-zag in every direction, just where they were placed forty or fifty years ago. There they are, an eye-sore in the landscape; and there they are likely to remain, because their owner or his sons have never had ambition enough to take them down, clean the ground on which they have stood, and put them up again in straight and neat form: and worse, the same state of things is too often seen along the lane and in the door-yard around the house—a rail down here and another half-down there, a pile of wood in one place, a few rails in another, and an odd stick or a few stones somewhere else.

This again is too often the background to a bleak, cheerless house, without a single tree to protect it from wind or sun. The owner has never planted any trees, either because he did not think worth while to do so, or because he could not afford to go to a nursery and buy what he wanted. He might have gone to some woods and got a few small evergreens, two or three elms, a few oaks, and a dozen or more maples. If he had gone to this trouble and had planted his trees carefully, they would have grown while he was sleeping or working on his farm, and by this time would have given his home a cozy, comfortable appearance and have added quite a little to the value of his farm. Let the young men wake up and begin to study how, with the least possible expenditure of money, they can improve the appearance of their farms and add to the beauty of their home and, its surroundings.

With a view to emphasise the importance of education, I shall simply call attention to the fact that in every community the educated classes, be they few or many, are always the ruling classes; and as long as the lawyers, doctors, and other professional men in this country, are better educated than the farmers, so long will they rule over the farmers even if the latter were relatively twice as numerous as they now are; so long will the farmers be hewers of wood and carriers of water for their professional neighbors Hence we think it very unwise for a farmer to give a good education to the boys who are going to enter some of the professions, and some land without much, if any, education to the one who is going to stay at home and make his living off the farm. Let the boy who has decided to remain at home have also a fair chance for an education, even if he get a little less land; otherwise he will always be regarded as in a sense inferior to his better educated others

Farmers may not be able to send all their sons to college, or even to a high school. They can, however, do two very important things towards the education of their children (1) Give them all a good public school education, and (2) provide a fair supply of good, wholesome reading matter for them in their own homes. Many farm homes are very bare and deficient in books, papers, and magazines. Their owners think, honestly think, they cannot afford to buy such literature for their families; and yet they can afford to spend quarter after quarter and dollar after dollar in buying tobacco and treating their friends every time they go to the village. Let no man dare to buy a single plug of tobacco or treat the best friend he has in the world even to a single glass of soft stuff, until he has spent at least $10 a year in buying papers, books, and magazines for the use of his wife, his children and himself. Let him buy a few well selected books every year, and take a nice magazine, with the local paper, one of the great weeklies, his church paper, and one or two agricultural, stock, or dairy journals. When he has done this, aud not till then, he can say that he has taken the second important step towards providing for all his children the education which they so much need.

STOCK BREEDING.

By H. B. Jeffs, Bond Head, Ont.

As quite a number of papers have been written on this subject by gentlemen eminently qualified for the task, who have brought their many years of experience to bear in producing papers of great value, the perusal of which has been both a pleasure and profit to those engaged in stock-raising, it will, therefore, be impossible not to encroach upon territory already covered by a royalty in this regard. However, so many features present themselves in the consideration of a question having such a variety of conditions that something may possibly bear reviving.

From the amount of capital invested in live stock, and the amount required for animal consumption, the importance of a correct understanding and application o the principles of breeding and rearing becomes very apparent. That there is a very great difference in the result of the various ways of breeding, feeding and housing stock is as unquestionable as the fact that there are different ways practiced; and that there is a right and wrong way, dependent somewhat upon circumstances, is alike undeniable. Gumption is one of the first requisites for the stock raiser. The faculty of knowing what is wanted, and of selecting and using such appliances as will satisfy that want is very necessary. Clear perception, if not intention, is necessary for the adoption of the means to the ends, and energy and efficiency must accompany it else it will be useless; while acute sensibilities, tender sympathy, and a constant care for the comfort of the animals are manifest characteristics.

'Blood will tell' is as true now as when first uttered, and while "like begets like" is none the less true the breeder must understand that likeness exists not less in the blood than in the external appearance. He must not think that because he finds certain high grade animals which are equal or superior to their pure bred parents that he can duplicate those grade animals with any certainty by breeding them together; their progeny may be like their parents or show affinity to either branch of their ancestry, even back to the 3rd or 4th generation, but the blood in them will tell.

The only way to breed animals of any species with certainty is to use only thoroughbred stock; that is, stock that have been bred in line long enough to have a type and character of their own, which they will transmit to their offspring. The man who buys a male animal by paper pedigree stands in jeopardy evrey hour of being left in the race. He should have individual merit as well as the certificate. An inferior pure bred has more impressive power than a scrub or native; therefore it will take longer to weed out such a cross than it will a grade. There are blues and better blues.

There is much pertaining to this matter which cannot now and probably never will be clearly explained; but there seems to be in the constitution of every perfect male or female a certain infinitely divisible subtle fluid, each particle of which possesses a definite character. In thoroughbred stock these particles have become so assimilated that they are all of the same type, and the character of their offspring is as certain and unalterable as laws of the Medes and Persians; not varying under the same circumstances more than the letters made by the printer's type differ by variation to the amount of pressure and ink applied to them.

On the contrary, in grade animals these particles are as infinite in character as in number; consequently their progeny have no fixed type, being red, white or blue, good, bad or indifferent. Although grade stock cannot be bred with any degree of certainty as to size, color or character, the breeding fit ought not by any means be discouraged, when for lack of funds or other reasons purebred stock cannot be raised. In most cases grades are superior to the so-called natives, but still they are very uncertain. Thus you will understand the necessity of using thoroughbred males. He who would be a successful stock raiser must not only use superior animals, but be a thorough-going man himself, not forgetting for a moment that his horses, cattle and sheep are no more animals than himself. If he is not able to stand intense heat or cold, rain, snow or wind from a hard bed, hunger or thirst, neither are his animals. Sheds should be erected in every pasture, where there are not sufficient shade trees, to protect farm stock from the burning sun and severe storms, and in winter they should be supplied with warm and well-ventilated stables to protect them from the cold. They should always have a good supply of wholesome food, fresh water, salt, lime, ashes and sulphur, and a good bedding of straw.

REPORT OF EXPERIMENTS IN HORTICULTURE.

Presented by Elmer Lick, Oshawa, Ont.

The Committee after consultation by correspondence, thought best to conduct an experiment in testing new and promising varieties of potatoes. Accordingly the following circular was sent, first to those who had previously conducted experiments under direction of Horticultural Committee, but unfortunately we were unable to secure the addresses of some of them. After replies had been received, circulars were then sent to other reliable parties until fifteen experimenters had been secured.

GUELPH, APRIL............, 1891

DEAR SIR,—It has been decided by the Horticultural Committee of the Ontario Agricultural and Experimental Union, to carry on the following experiments with potatoes: –Testing new varieties with a view of arriving at correct conclusions as to earliness, productiveness and quality. The following six varieties will be sent out: Rural No. 2, Empire State, Summit, Thorburn, Puritan, Crown Jewel. Five pounds of each will be sent to each experimenter. The seed will be supplied by Steele Bros., Toronto. Each variety must be cut to two eyes and distributed as nearly uniformly as possible over six rods of row. The rows for the six varieties to be adjoining, and the soil as uniform as possible. Send the weight of five rods of row, the other rod is to be used in testing at different dates. In digging be careful to weigh accurately, and forward results on blank form, as soon as possible, to ELMER LICK,

Secretary of Committee, Oshawa, Ont.

N.B.—Those who carried on experiments and reported results during the past will be first supplied, others in order until limited supply is exhausted; therefore send postal card to Secretary as soon as you receive this, if you wish to undertake the experiment; also give your nearest express office.

The seed was not good in some instances, especially that of the Rural No. 2, the major portion of which failed to germinate. The results, therefore, concerning this variety were entirely unsatifactory. On account of dry weather two of the experimenters failed to obtain results worth anything from an experimental standpoint. Owing to rot another gentleman was unable to give accurate returns. Still another used the term "about" in connection with the weight of small potatoes. All the above have been omitted in making averages, as well as Empire State in Mr. James Forsyth's report owing to the failure of that variety to grow.

In the annexed tables the reports are summarised. The average yield per acre is calculated by averaging the distance of the rows apart. This average was 32⅓ inches. While results calculated in this way may not be exactly accurate, yet they will be near enough for all practical purposes.

Showing average weight of each variety and estimated yield per acre.

Experimenters.	Rural No. 2.		Summit.		Puritan.		Empire State.		Thorburn.		Crown Jewel.		Distance of rows.	Soil.	Crop 1890.
	Total weight.	Small.	Total weight.	Small.	Total weight.	Small.	Total weight.	Small.	Total weight.	Small.	Total weight.	Small.			
	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	in.		
H. A. Hunter ..	30	5	75	11	15	3	47	6	45	8	40	10	30	Sandy loam.	Buckwh't plowed under.
E. M. Zavitz ...	$37\frac{7}{16}$	$2\frac{7}{16}$	67¾	6	$51\frac{14}{16}$	$4\frac{14}{16}$	$89\frac{5}{16}$	$9\frac{6}{16}$	$50\frac{1}{16}$	$5\frac{14}{16}$	$74\frac{4}{16}$	$5\frac{6}{16}$	27	Sandy loam & shale.	Turnips.
G. G. Shirreffs.	25	4½	94	6	85	10	50	10	64	6	46	10	28	Gravel loam.	
Thos. Steadman.	77	1	142	8	79	9	114	8	93	8	102	6	30	Black loam.	
N. J. Clinton...	56½	5	49	4½	83½	7½	29½	4½	71½	5	33	¾	30	Gravelly loam.	Potatoes.
R.T.Richardson.	43	3	151	7	127	12	137	6	110	14	163	7	30	Clay loam.	Peas.
James Forsyth..	16	2	101	8½	67	13½	....	....	58	16½	73	7¼	30	Clay loam.	Corn.
G. F. Blaney ...	28	1	109	2	62	5	117	2	62	....	90	3	36	Clay loam.	
E. Lick	30½	1	118½	8½	70	10	107½	6½	50	7½	99½	11	36	Clay loam.	Potatoes.
R. Stutt........	65	....	104	3	59	4	119	4	47	5	76	3	36	Clay loam.	
J. French. ..	44	¾	103½	7½	67½	9½	82	7	53	8	92	11	36	Sandy.	Oats.
One row, 5 rods, average yield..	41.1	2.3	101.3	6.5	69.7	8.0	89.2	6.3	63.9	3.3	80.8	6.7			
Yield per acre..	bush. 133.6		bush. 329.2		bush. 226.5		bush. 290.0		bush. 207.7		bush. 262.6				

Showing average period of maturity and reported mealiness and quality of each variety.

—		Rural. No. 2.	Summit.	Puritan.	Empire State.	Thorburn.	Crown Jewel.
Average number days from planting to maturity		123	115	101	117	108	102
Mealiness	good	3	8	9	3	4	8
	medium	7	3	2	8	8	3
	bad	2	1	1	1	....	1
Quality	good	5	9	11	6	6	9
	medium	6	3	1	4	6	3
	bad	1	....	....	2	....	....

REMARKS OF EXPERIMENTERS.

H. A. HUNTER, Co. Dufferin: I think Summit and Empire State are good varieties. I like their appearance much better than the other four varieties. However, I will be able to speak more definitely another year.

EDGAR M. ZAVITZ, Co. Middlesex: I planted the White Elephant variety on May 13th and harvested the potatoes on the 10th of September. The weight of the crop was 74 $\frac{10}{16}$ lb. of which 7½ lb. were small ones. The quality and mealiness of this variety was excellent. The Dakota Red were planted on May 13th and matured on the 9th of September. The weight of the crop was 75 11-16 lb., of which 3 5-16 lb. were culls. The quality and mealiness of this variety was only medium.

GEORGE G. SHIRREFFS, Co. Russell: The Summit yielded the best and was also first in quality but seemed more inclined to rot than the other varieties. The Rural No. 2 yielded poorly partially due to the rotting of the seed. I purchased a pound of Rural No. 2and had far better returns both last year and this year from this variety, although they were planted on similar soil to those in the experiment. I found Puritan quite free from rot, and also a good producer and of first quality for cooking.

THOMAS STEADMAN, Co. Lanark: The Summit potato yielded very highly and has a fine appearance. The Crown Jewel is of prime quality and yields well. The Empire State seems to be a wonderfully prolific potato as the report shows. Something appeared wrong with the Rural No. 2, as not half the seed grew.

ELMER LICK, Co. Ontario: Also tried the Rural Blush. The crop weighed 102½ lb. of which 4 lbs. were small ones. I planted on the 8th of May. In culling the seed I found Rural No. 2 made 75 pieces; Crown Jewel, 121; Thorburn, 122; Empire State, 133; Puritan, 158; Summit, 188.

RICHARD STUTT, Co. Lambton: The seed of Rural No. 2 that we received was so large that it only planted half the ground, but under equal conditions I think the Rurals are the best yielders. The earlier varieties were planted too late.

WALTER S. CLAPP, Co. Prince Edward: For late varieties I prefer Rural No. 2, Summit and Empire State. The Rural were the nicest size and I should judge the best for winter use. Of the early varieties I like the Puritan best.

N. J. CLINTON, Co. Essex: Rural No. 2 were a very even sample with sunken eyes. Summit and Puritan were nice and even throughout. The Empire State were largest and smoothest, while Thorburn were not so smooth or regular in shape. The Crown Jewel were large but contained only a few eyes.

J. S. HOWES, Co. Wellington: So many of the potatoes were rotten we could not arrive at any definite conclusion. The Rural No. 2 were not so prolific, but none were rotten or small; the others contained both. In no case were any of the rotten ones weighed.

R. T. RICHARDSON, Co. Carleton : I found the strong top of the Empire State withstood the ravages of the bug most successfully. I also noted the small number of eyes on Rural No. 2, which would necessitate the use of more seed for this variety per acre.

JAMES FORSYTH, Co. Wellington : Rural No. 2 and Empire State did not come up well. I think the seed was poor. None of them were suitable for cooking before July 25th, and Rural No. 2, Summit and Empire State were tender then.

G. F. BLANEY, Jr., Co. Norfolk : The seed of Rural No. 2 was very bad. None of the potatoes were fit for use on the dates indicated above.

CONCLUSIONS.

Conclusions which may be drawn from this series of experiments :

1. That the Summit potato is one likely to give general satisfaction, standing first in yield, 329.2 bushel per acre, and second in mealiness and quality. Two objections may be raised to this, however, first, that the five pounds gave more pieces, and second, there is a possibility of this variety rotting worse than others.

2. Rural No 2 stands last in yield, 133.6 bushels per acre. This result is valueless owing to imperfect seed, every indication pointing to this as being a heavy cropper under equal conditions.

3. The order of yield is as follows : (1) Summit, (2) Empire State, (3) Crown Jewel, (4) Puritan, (5) Thorburn, (6) Rural No. 2.

4. The order of quality : 1, Puritan ; 2, Summit and Crown Jewel (equal); 3, Thorburn ; 4, Empire State; 5, Rural No. 2.

5. The order of mealiness : 1, Puritan ; 2, Summit and Crown Jewel (equal) ; 3, Empire State ; 4, Thorburn ; 5, Rural No. 2.

6. The order of earliness as indicated by the reports : (1) Puritan, (2) Crown Jewel, (3) Thorburn, (4) Summit, (5) Empire State, (6) Rural No. 2.

C. A. ZAVITZ—Experimenters say there was difficulty in putting in the potatoes as they did. It is very difficult to get a satisfactory system for planting potatoes for experiment purposes. If you cut the potatoes into pieces with two eyes you get, in some instances, too many pieces; if you take an even number of pieces you have again, in some cases, too many eyes ; and if you take out the eyes you do something that is out of the ordinary farm practice. Our system has been to take equal quantities of potatoes and divide them into an equal number of pieces. This year we have taken one peck of each variety and divide it into 200 pieces. If the potatoes are large, they may be cut into 2, 3, or 4 pieces ; if small, some may be left whole and others divided into two or three pieces. I think that on the whole this is about the best system which we can use in the experiments with potatoes.

President MILLS—Have you any experience to prove that it is a matter of importance to select the best sample of seed ? Does it matter whether you sow the average crop or pick the seed ?

S. HUNTER—It is said if you want a good crop of corn, take the seed from the whole ear.

President MILLS—A certain man selected his corn for years. He watched the ear that developed soonest, planted this, watched again the next year for the earliest, and followed this plan until in this way he changed the date of the ripening of his corn to two weeks earlier. I met another man who picks his seed grain by hand, and he says by comparing the results from the hand-picked with those from unpicked seed he has found that he has made from 14 to 15 per cent. advance from the hand-selected grain.

Mr. SHARMAN—In what did he advance ?

President MILLS—Quantity principally, but also in quality.

Q—Should seed grain be more ripened than that which is for sale ?

Mr. ROBERTSON—We are apt to loose the very best grain if we leave it till it is ripe.

A MEMBER—From experience, I know that it is from hand-picked seed that prizes are taken. I think there are fanning mills, however, at the present day which will select the good seed to a great extent. By putting in a proper screen, we can take out all the finest and sow nothing but the plumpest. I think it does not matter to a few days as to the ripeness of the seed. It would not be wise to let the best of it fall to the ground for the sake of letting it get ripe. It is because our barley gets too ripe that it does not sell better on the English market.

ANNUAL SUPPER.

Before the afternoon meeting adjourned, President Mills invited all visitors present to join the College officers and students in the dining hall to partake of the Matron's hospitality. After supper was served various toasts were proposed and fittingly responded to by members of the Union and others. A very enjoyable evening was thus spent.

The first business taken up on the second day was the report of the Nominating Committee. The election of officers resulted as follows :

OFFICERS FOR 1892.

Honorary President	James Mills, M.A., O. A. College, Guelph.
President	Nelson Monteith, B.S.A., Stratford, Ont.
Vice-President	S. P. Brown, Whitby, Ont.
Recording Secretary-Treasurer	David Buchanan, B.S.A., Hensall, Ont.
Corresponding Secretary	R. F. Holtermann, Brantford, Ont.
Editor	C. A. Zavitz, B.S.A., O.A.C., Guelph.
Auditors	H. Story and Jas. Atkinson.

DISTRICT OR COUNTY SECRETARIES.

There was no change made in these officers, a list of whom appeared on page 192.

Delegate to the Central Farmers' Institute, C. A. Zavitz, O. A. College, Guelph.

COMMITTEES ON EXPERIMENTS.

Agriculture—T. Shaw. A. E. Shuttleworth, C. A. Zavitz, H. Story, A. M. Soule, D. Z. Gibson, A. Yuill, Jas. Atkinson and R. Harcourt.
Horticulture—E. Lick, H. L. Hutt and Nelson Monteith.
Dairying—H. H. Dean, S. P. Brown and J. W. Palmer.
Live Stock—T. Shaw, D. Buchanan and J. A. B. Sleightholm.
Apiculture—R. F. Holtermann Husband and W. Haight.

REPORTS OF COMMITTEES.

The Committee appointed to consider the President's Address, report as follows :

1st. That the feature of individual experiments be encouraged and developed, and that reports of such as come under our observation be sent to the O. A. C. *Review* for publication.

2nd. That we as an Experimental Union, should confine our work more particularly to that branch of experiments which our experiment stations cannot do for us.

Signed on behalf of the Committee,
D. BUCHANAN.

The report was adopted.

Upon the recommendation of a Committee appointed to deal with the matter, the "Personal Editor" of the O. A. C. *Review* was appointed to secure a complete register of the names and addresses of students and ex-students of the O.A.C.

TREASURER'S REPORT.

—	Dr.	Cr.
	$ cts.	$ cts.
To amount on hand	70 66	
" membership fees	36 50	
" Government grant	400 00	
By grains, fertilisers, printed forms, expressage, etc., for experiments in agriculture		202 87
" potatoes, printing, postage, etc., for experiments in horticulture		25 41
" comb foundation, printing, postage, etc., for experiments in apiculture		38 41
" reporting meeting, editing report, travelling, printing circulars and programmes, postage, etc		78 64
" balance on hand		161 83
Total	507 16	507 16

We, the undersigned Auditors of the Ontario Agricultural and Experimental Union beg leave to say that we have examined the accounts of the Treasurer for the past year and have found them to be correct.

(Signed.) R. N. Morgan,
R. Harcourt.

O. A. College, Guelph, Jan'y 28th, 1892.

HOG RAISING.

By J. A. B. Sleightholm, B.S.A., Humber, Ont.

The importance of the hog industry as a means of financial gain is made self-evident by the fact that every cotter has his sty, and every farmer his pen, while the middleman has his comfortable precentage. A review of statistics show this to be no infant industry, but one fast becoming a national industry with considerable export trade.

The Chicago stock-yards show for 1886 the receipt of 6,718,761 hogs. The same yards received for the month of November, 1880, 1,111,997 hogs, while the receipts for the whole year were 7,059,305. Within the last twenty years Chicago has received hogs representing a value of more than one billion of dollars. Wm. Davies & Co., of Toronto, handle 80,000 hogs annually, which are chiefly exported. Further the flesh of the genus Grunto is universal in its use. The fried ham and breakfast sausage being everywhere welcomed as refreshing, comforting and grateful.

Let us now consider the subject more practically. Hog raising can hardly be termed an exact science, though science it is as demonstrated by the success of Sanders Spencer, Walker-Jones of England, and Snell, Featherston and others, whose names are familiar in Canadian homes as synonyms of success in hog raising.

We do not purpose dwelling on any particular breed, but would ask permission to exclude the 'razor back' and trotting species, having no reliable data to hand concerning them. In breeding hogs for the best market they should invariably be farrowed by April the 1st, and ready for the block any time after July 1st, until the first week in September, during which period prices usually range highest. Select dam, good individually and by heredity. To be good individually she must have plenty of length and depth of body, with a full, well developed ham and shoulder. We think hogs generally have a greater amount of pure blood than any other class of farm stock, hence the most watchfulness must be in feeding, care and management rather than in breeding as in other classes of animals.

First, feed the dam liberally on barley and pea meal in proportion of two of former to one of the latter, with two parts shorts or middlings. Mix this with water to the consistency of porridge, and let it remain at least six hours before feeding. Allow the young pigs to suckle six or seven weeks, and castrate at four weeks. When three weeks old place skimmed milk with a sprinkling of shorts in a recess for the young pigs, but out of reach of the dam.

After weaning the young hogs, give them a large roomy pen with plank or other solid material for floor where fed, and the remainder of the floor should be earth. Six to eight are sufficient in a pen. An excellent ration may be formed by mixing one of pea meal, two of barley meal, and two of shorts or middlings, to a consistency of a porridge and feed three times daily, with punctual-attendance. Allow this mixture to stand until fermentation is slightly commenced, but not actively developed. Add two ounces of salt for each eight hogs daily. Never give feed to leave, but provide liberally. After the morning feed give a small amount of green fodder, such as green peas, which may be followed by green corn, etc.

By following this or a similar system, hog raising will become profitable, and the hogs one of the best markets for coarse grains. With moderate success a pound of pork can thus be produced at a cost of 5.07 cents and sold with average markets, at from 6.75 to 8 cents per pound, thus leaving a fairly remunerative margin of profit.

Q.—Do you allow a portion of the pen unfloored on purpose for exercise?

Mr. SLEIGHTHOLM—It is for their health—not for their health produced by the exercise, but by the soil. I would not, however, advise letting young pigs under six or eight weeks old have access to earth floors.

Q.—Do they tear up the floors? Some.

Q.—Do you let them have their own way in rooting the floor? Yes.

Q.—Do you have trouble in it getting muggy? No.

Q.—Does it become saturated with urine?

Mr. SLEIGHTHOLM—That depends on the drainage.

Q.—Do you think it would be easily possible to have too long a side in a pig. Don't you think we often get too long a portion of side with too little corresponding width of back, shoulder, and ham?

Mr. SLEIGHTHOLM—I am certain that we do. I think the side is often improved to the detriment of the more valuable parts of the animal. Hog packers recommend good side, but yet they very much like a good ham.

Prof. SHAW—Some say we can get one cent more per pound for side meat than for the other parts. If, however, it costs us from 1½ to 2 cents a pound more to produce it, it is not profitable. I want to pay attention to the shoulder, and ham, and back, because they are much more easily fed.

Q.—What is your opinion as to the best cross that a Canadian farmer can make at the present time to produce pigs for marketing purposes?

Mr. SLEIGHTHOLM—The most satisfactory, according to my experience, has been found to be the very high grade Berkshire crossed by a pure York; and this appears to give universal satisfaction as to quality of flesh, strength of offspring, and the numbers of the offspring. I think the grades of the York will do better than the pure.

Prof. SHAW—The Yorkshires are composed of different kinds of pigs—some are pretty long in the leg and coarse boned, and some are broader in the shoulder, shorter in the legs, and finer in the bone. Which style would you prefer?

Mr. SLEIGHTHOLM—I think the medium and not the coarse and heavy boned ones are to be preferred. I would not use the first style.

Q.—Do you prefer breeding your sows twice a year, or do you think once better.

Mr. SLEIGHTHOLM—I prefer breeding twice, if I can get a spring market at remunerative prices.

Q.—Which is the more profitable, to sell pigs dressed or by live weight?

Mr. SLEIGHTHOLM—For us, it is better to sell dressed, because of having access to Toronto market. We sell some on foot. In some parts they sell almost exclusively on foot, but we would lose by so doing.

D. BUCHANAN—What do you consider the two best seasons for marketing, when you raise two litters in the year?

Mr. SLEIGHTHOLM—I think the best season is in August, but have your hogs ready any time after the 1st of July, because the market fluctuates more or less. Of the other market, I cannot speak so positively, but have been told that May prices are good.

Q.—Do you think that pigs can be fed at much of a profit and marketed in the months of November and December, taking prices as they have been during the past three or four years?

Mr. SLEIGHTHOLM—I do not. You could buy hogs much cheaper in December than in August the past year. We got 7c and can buy now for 5½c.

Q.—Do you think there should be a difference in the conformation of the boar and sow in breeding?

Mr. SLEIGHTHOLM—I do not think anything could be gained largely from just trying to have them different, but at the same time I think if you have a sow that is short in the side and well developed in the hams and shoulders, it would be exceedingly wise to get a lengthy hog to couple with.

Q.—If you were to have one longer than the other, would you prefer that it should be the sow or the boar.

Mr. SLEIGHTHOLM—I prefer to have the sow lengthy.

Q.—Why do you use high-grade Berk sows with pure York boars.

Mr. SLEIGHTHOLM—I would just say that that has been followed, and what I have spoken is from our own experience, but the method you refer to has not been followed, that is, the coupling of high-grade Yorks with Berk sires.

D. BUCHANAN—The grade Berkshire sow is the stock of the country; and if we are going to improve from these, the only way to do is to use the more lengthy boar.

Prof. SHAW—I do not think the results of that cross would be equally good with the results of the cross that we have been speaking about. You will remember that in both cases the sow is a grade, and not a pure bred; and we are trying to improve in the direction of the Yorkshire rather than in the direction of the Berkshire. If we are to effect improvement by using the Berkshire we cannot do it so well as by using the Yorkshire. The progeny will resemble the pure sire. We are seeking more stamina, more bone, more side meat and prolificacy; we get these in the Yorkshire. The great advantage of using the Berkshire grade on the female side is this, that owing to the good feeding properties of the Berkshire, we can make pork for market from the sows after they are through breeding. If you want a certain set of other properties, the other cross might be in order.

Q.—Do you consider the porking animal as good a mother and milker as one which is a little weak in this important point?

Mr. SLEIGHTHOLM—I would not, on the same ground as dairy cattle.

Prof. BURNETT—I consider length in the sow more important than length in the boar. The sow with lengthy sider is a better mother and produces largers litters. The boar, on the other hand, may give heavy hams and shoulders and a broad back to a greater extent than he can to size of litters or the other points which we naturally look for in the sow.

Q.—At what age do you market your hogs?

Mr. SLEIGHTHOLM—We find the most profitable age about five or six months, when they go about 150 lb. dressed.

Prof. BURNETT—Some advocate keeping one litter longer than the other, that is, market the fall litter at about seven or eight months and the spring ones at a younger age.

Mr. McKENZIE—This year the prices were low, and some persons kept their hogs till the end of January and realised better by so doing; so I think there is a good deal in carrying the pigs over longer than usual if we have any prospect of the market improving. Some Berkshire breeders are endeavoring to increase the length of their hogs.

and if they are successful in this, I think we should encourage them ; and this will do as well as by introducing the Yorkshires.

Prof. SHAW—Mr. Sleightholm says that he has fed pigs, making 2½ cents per pound clear, not taking manure or feeding into consideration. When graduates of this College do such work, it shows the necessity of an institution such as this.

Q.—Is it injurious to leave the sows after they are in pig with the boars ?

S. HUNTER—I have always let them run together till near the time of farrowing.

Q.—Is it advisable to confine hogs during their growing period or to give them a field to run in ?

S. HUNTER—I do not practice the confining of my young growing hogs at any age but I do prevent them from rooting by ringing them.

Q.—Do you think a floor injures their feet ?

S. HUNTER—I think it makes them weak in the limbs.

Q.—Would you confine breeding sows on floors ?

Mr. A. MCKENZIE—No. As a general rule they are never confined.

POULTRY IN ITS RELATION TO AGRICULTURE.

BY A. G. GILBERT, DOMINION EXPERIMENTAL FARM, OTTAWA, ONT.

I appreciate the honor of being requested to read a paper before the members of the Ontario Agricultural and Experimental Union. I sincerely trust that my efforts will meet with your approval, for approval from practical—and inseparably critical—workers is the most gratifying of all. With your kind permission I will treat the subject you have allotted to me from the standpoints : (I) Poultry in its relation to Agriculure ; (2) Poultry in its relation to the Agriculturist.

In relation to the great Agricultural industry, the unpretentious hen, at first glance may not appear to be the important factor that she really is. I contend that poultry stands as one of, if not *the* most important, of the agricultural branches. Indeed, the subject is one of such magnitude and can be treated from so many vantage points, that it is difficult to do it justice in a single paper. The great importance of the poultry interests can only be learned when figures are submitted, and I have collected such figures and facts as the little opportunity to get at both has permitted me.

Taking the list of eggs and poultry exported from Canada in the year ending 30th June, 1889, we find the amount $2,274,211, less only in value—in the whole list—than lumber, cattle, fish, barley, coal and cheese, but greater than any other articles exported. Taking the list of the agricultural products—and their value—as exported in the year above mentioned, 1889, we have barley representing $6,464,492, the eggs and poultry standing next with their $2,274,211, as compared with indian corn, $2,191,110 ; wheat, $1,754,957 ; peas, $1,449,417 ; apples, $1,528,449 ; and hay, $934,082. It may be considered singular, but it is true, that the value of the eggs and poultry exported in that same year, 1889, exceeded that of any single branch of manufactured articles, and was more than half the amount of the total value of all manufactured articles exported. In the latter comparison it stands in the same relation to the total exported produce of the mines. In the following year ending 30th June, 1890, we find the value of the eggs and poultry exported to the United States stands third on the list representing $1,842,424, as compared with $1,887,895 for horses, and $4,582,562 for barley. And, in all fairness, it must be remembered that the eggs and poultry figures represent an undeveloped industry. When the same attention is given to egg production that there is to the growing of barley, it is more than probable that its value will be so great as to put it at the head of the list. Can any other branch of agricultural industry warrant a more promising estimate ?

Turning to the United States and taking the census figures of 1880, we find that in that year the products of the orchards amounted to the large sum of $50,876,250, but the same authority states that the egg production in that country for 1879 was over $100,000,000, or nearly double in value that of the orchard products; the products of the market gardens for the same year were valued at $21,761,250, but the eggs produced reached the enormous value of $91,382,383, or four times the value of the market garden produce. Mr. Edward Atkinson, than whom there is no better authority in the United States says, "that although the annual output of the western mines reaches an enormous amount, it is exceeded by the value of the eggs laid by the fowls of the country." These figures do not include the value of the market poultry raised in a single year, which being estimated at two-thirds the value of the eggs produced, reach the great figures of $150,000,000, the estimated annual value of the poultry products in the United States. Indeed, H. S. Babcock, one of the best writers and authorities on poultry matters in America, says, "these figures are altogether too small." Again the United States census figures of 1870 say that the cotton crop for that year was 3,011,996 bales; the corn crop, 761,000,000 bushels; the wheat crop, 288,000,000 bushels; the hay crop, 28,000,000 tons; the latter was valued at $280,000,000; the cattle, swine and sheep slaughtered were valued at $398,950,376. Yet the poultry produce of the country exceeded either of these products, and was only equalled by the entire meat and dairy products combined. Mr. I. K. Telch, another well known author and poultry judge of Natick, Mass,, says, "although the poultry interest of the nation has been considered of minor importance, yet upon investigation it has been found much larger than any other agricultural product, and we become amazed at the amount of wealth accumulated by poultry keeping." The same authority says, "that computing the nine million families in the States in that year, 1870, as consuming two dozen eggs per week and $20 worth of poultry per year, we have, counting the eggs at 25 cents per dozen, over $405,000,000. And there has been a very great increase in population and consumption since that date. In 1879 it was calculated that the hotels of the country alone consumed $62,483,000 worth of eggs and poultry. In this also there has been a very great increase in value in the last decade."

In 1878, at a convention of butter, cheese and egg producers held in Chicago, the most careful and reliable statistical reports that could be gathered showed that the annual production of eggs was valued at $180,000,000, and poultry sold at $70,000,000. But Mr. James E. White says these figures are far below the mark, and corrects them by stating that supposing at that date the population of the United States to be about fifty millions of people, and if each one of this population was to eat an egg that day, there would be consumed in eggs alone $1,000,000, taking eggs at the market price of that day; and if each one were to eat an egg each day for a year, the consumption of this one article would amount to $365,000,000; add to this the value of the poultry consumed estimated at $121,666,548, and it will be seen that the eggs and poultry consumed would represent a money value of $486,666,648; add to this the value of the stock carried over $45,000,000, and to this the sum realised from sales of fancy fowls and their eggs, which is not less than half a million dollars annually, and you have the enormous sum of $532,166,648, which is $32,000,000 more than the value of the corn crop of the United States for 1879, and $189,842,857 more than the wheat crop of the same year. But some doubting Thomas will say that there are thousands of the people who do not eat an egg each day. Granted, but there is the fact that there are many other thousands who eat from two to four eggs daily, and there are the eggs that enter very largely into the composition of articles of daily diet, such as cakes, omelets, salads, coffee, custards and puddings, besides those used for chemical and medicinal purposes.

Immense quantities of eggs and poultry are consumed by cities. Take for instance Philadelphia, with a million people daily consuming 525,528 eggs. In one year the population consumed 59,290 barrels and 97,390 boxes of poultry, and the hens that were spared the hatchet had to lay 15,984,600 dozens of eggs. What must the figures be to represent the supply of a city such as London, England, with 5,600,000 inhabitants.

The poultry production of France is said to amount to $168,000,000. From its poultry and egg interests that country realises $200,000,000 annually. The annual exports to England alone amount to $13,000,000. Belgium, with a population of 5,500,000, produces annually 274,967,824 eggs. This represents 48 eggs for each man, woman and child, and this, says a writer, in a country where the most persistent effort is necessary to cause the land to produce food necessary for home consumption, and where a vast amount of labor and money is expended in the cultivation of the soil.

Many of the figures I have quoted above may be said to be old. All the more likelihood of their being under than over the actual state of affairs to-day.

Speaking of the poultry interests, R. S. Deener, after a life-long experience, writes enthusiastically as follows: "The poultry business is the only industry in the world that can never be centralised, never cornered. It is the only industry in the world that cannot be affected by corporations, trusts and syndicates. It is the only specialty carried on in North, East, South and West, that is materially unaffected by the cold of the one or the heat of the other. It is the only product known to the farmer from which he may at any time realise some ready money. It is the only investment known to the small capitalist that will pay him from 10 to 500 per cent. and not ruin him if he loses his entire stock. It is the only pleasant and profitable occupation that can be engaged in by man or woman alike with equal chances of success. Few people realise the enormity of the demand. It is an industry that is yet in its infancy. The supply will never exceed the demand." These are certainly strong statements, but they are indorsed by the experience of many other breeders. I do not say that other branches of Agriculture are not important, but I do say that after the figures and facts I have given that I am justified in claiming a front place for poultry in relation to Agriculture.

In relation to the agriculturist, poultry occupies the position of an undeveloped mine of wealth. The farmer asks the reason for its value. The answer is because for the capital invested there is nothing about the farm that—with proper management—will return so great a profit. It is the only department of the farm that will utilise what might be waste and give in return for it.

1, The egg, representing cash at all times.

2. The young, which are revenue producers in 3 to 5 months.

3. The valuable manure.

4. The body of the hen which will bring a fair price after rearing several broods of chickens and laying a large number of eggs.

It seems to make no difference with poultry whether they are housed beneath the slate roof of a pretentious building or in a deserted pig pen so long as they are kept dry, fairly warm and well attended. The farmer enquires. "What percentage of profit may I expect?" In answer I quote from Stoddard, author of twenty-five works on poultry. He says: "One dollar per hen profit, where large flocks are kept, is a very good profit, that is about one hundred per cent. on the investment. In smaller flocks two and even three dollars per hen is realised. But such prices are the exception and not the rule."

The Rev. R. S. Woodgate, of Pembury Vicarage, Tunbridge Wells, England, says: "My egg and butter trade are rapidly increasing. My eggs paid me last year, 1886, a splendid percentage. This year my custom is so grown that it is almost too much to superintend."

Mr. G. P. Enty, a practical farmer, says: "In some of the mountainous counties there are many farms on which people toil year after year trying to gain a living from the unproductive soil, while such farms have every advantage for successfully growing ducks, geese, turkeys and chickens."

Mr. Pierce, a well known poultry author, says: "Farmers and mechanics in the rural districts, as a class do not give any special attention to poultry raising, ignoring it as of no consequence, and on the whole rather beneath their dignity as men and freeholders, when if they would investigate and act they would find, as has been demonstrated over and over again, that there is more actual profit in a flock of 100 fowls, properly handled, than in one hundred acres of grain at present prices."

Now see what a woman can do. She writes that in the State of Maine last year she kept 100 hens and carefully kept the record. The number of eggs produced were 16,800. She sold them for prices ranging from 12 to 28 cents per dozen, which brought her $276; the cost of keeping the fowls during the year was $70, leaving a net profit of $196. Now, what one can do another can, and $1.96 per hen exceeds any other agricultural production I know of.

Henry C. Welster, a young farmer of Booth's Corners, Pa., says poultry pays him better than any other department of his farm. During last year he sold 4,337 dozens of eggs and received in cash for poulty and eggs $1,050, of which $441 was clear profit. The droppings he said paid for his time and labor.

Another farmer in that well known publication the *Country Gentleman*, says: "I have 125 fowls.

Last year I sold 625½ dozens of eggs for	$123 21
Sold chickens worth	16 95
Worth of manure	30 00
	$170 16
Cost of feed	48 61
Leaving a profit of	$121 55

The manure I consider worth $30 for the year. I live 20 miles from any large town and have to ship eggs to New York."

James Rankin of South Easton, Mass., who began as a farmer but is now solely engaged in the poultry business claims a profit of $7 per fowl with the aid of his incubators. Coming nearer home, Mr. Thomas Graham, a farmer residing near Ottawa, told me he had made more money out of 200 hens than he did out of ten cows. Mr. William Feeley, residing on the Gatineau Road, near Ottawa, sent me the following statement of the results derived from his management of 15 Plymouth Rock hens during the year 1889:

Eggs laid by the 15 hens during the year 2,002, which make 167½ dozen, and allowing 25 cents per dozen, we have say	$41 50
Value of 38 chicks raised by the hens, allowing 20 to be cockerels, at 50 cents each, and 19 pullets at $2 each	48 00
Value of 14 hens left, one having died	7 00
	96 50
Deduct cost of feed for hens and chicks	17 90
Leaving a balance of	78 60

And this from only fifteen hens, but hens that were intelligently handled.

Mr. J. W. R. Paterson, of Calgary, writes to me under date of 23rd December, 1890: "Last fall I bought 30 common hens and pullets. I followed your instructions as closely as possible, and my hens are now laying, and I am selling the eggs at 50 cents per dozen. This tempts me to go into better bred fowls and more of them."

Dr. J. S. Niven, of London, Ont., writes on the 30th December last as follows: "I kept a record of the laying of 10 Redcaps, 3 Houdans, 1 Wyandotte and 1 Redcap-Houdan cross. They layed from the 7th January till the 23rd November, 2,153 eggs, or an average of 143 eggs each. This I consider very good. I used the halfbreed and Wyandotte for setters, so that the Redcaps, who do not sit, must have layed, I should say, 150 eggs each.

Further instances could be given, but time will not permit further encroachment upon your patience. I have endeavored to quote from all sources and all quarters so as to present as diversified phases of the subject as possible.

You tell a farmer there is money in poultry and he replies, "There may be, but it takes a lot of knowledge and work to get it out of them." It takes intelligence and trouble to properly look after any department of the farm. The Divine ruling is that man must earn his bread by the sweat of his brow, and that sweat is often represented by experience, experience acquired by years of toil with brains as well as muscle. The man who invents a business that will make money for him while he sits down and looks at it will be the richest man the world has ever produced.

But, you say, you have not told us of the points of difference in the various breeds, nor your methods of treating them so as to make money out of them, nor lots of things about them that would be valuable to us. I reply, these are subjects for secondary consideration. My primary duty on the present occasion is to claim for the too often slighted and belittled hen that important position in the great agricultural industry that is rightfully hers.

Besides, to give even a rough outline of the experimental work I have been engaged in for the past four years or go into details of poultry management would make matter for two or three papers. Let me simply tell the farmers a few essentials to success:

1. Do not inbreed.

2. Give poultry better accommodation and more care.

3. Supply them when closely confined with what they can pick up when running at large, such as gravel, lime, dust bath, green stuff, etc.

4. Keep no hens over two years. Why? Because they will then moult so late that they will eat the prospective profit before they begin to lay.

5. Select the best layers to breed from, and so secure a good laying strain.

6. Watch closely for the hens that do not lay and cut their heads off.

7. Save the waste table scraps, all the kitchen waste. Mix into a hot morning feed, not sloppy. Do not feed too much.

8. Keep the hens busy by scattering straw or leaves about the floor and throwing the grain feed into it.

9. Learn how to manage the poultry department as well as any other live stock department and mark results. A strict record should be kept of expense and profit in order to give the poultry a fair show.

The breeds found to be the best for farmers among the varieties tried so far are the White Leghorns and Plymouth Rocks, for the reason that the White Leghorns have laid more eggs and the Plymouth Rocks have put on more flesh than any others. The Wyandottes make a good general purpose fowl. The Brahmas are also a fine fowl, but are a little slow in maturing, owing to their large frame, but they make large birds after six or seven months. Some crosses make fine layers and market fowls.

But when the farmers, as a rule and not the exception, begin to realise the value of their poultry as revenue makers, they will become enquirers after knowledge, and when they reach that promising stage it will be easy for them to obtain, through the many channels of information now offering, all instructions necessary to lead them on to success. That day of enquiry cannot come too soon for their advantage.

Q.—What do you consider the most profitable breeds of hens for the farmers, and is there any money in hens at present prices for eggs and poultry?

Mr. Gilbert—The most profitable is the Plymouth Rock or Wyandotte, as shown by an experiment we have conducted at the Experimental Farm, Ottawa. The poultry that goes on the market now is not properly dressed. When you learn to dress poultry properly you can get 15c. per pound for it. The eggs produced in Canada are produced at the cheapest time; though, to produce eggs in winter, you require to give very close attention to the feeding of hens.

Q.—How would you dress poultry ?

Mr. Gilbert—After killing a fowl the insides and the crop should be removed as quickly as possibly. It is also better to pluck it without scalding, as the skin then retains its white appearance.

Q.—Would you advise washing eggs before taking them to market ?

Mr. Gilbert—I would, because you can get more for them.

W. J. Palmer—I have heard that farmers do not wash their eggs, especially when shipping to the Old Country.

Q.—Is there any money in eggs at 12 and 16 c. per dozen ?

Mr. Gilbert—Yes. Prof. Orkett says they get only 10 cents a dozen for their eggs and still make money out of them.

Q.—Would you crowd hens together in one large room in their winter house ?

Mr. Gilbert—It is always better to divide them up into small groups. You will make more out of 20 separated than 40 crowded. I never keep a hen over two years of age for the reason that hens older than that have a predisposition to put on fat rather than to lay.

Q.—Does the food affect the flavor of the eggs produced ? Yes.

Q.—What do you think of feeding dead horses, etc ?

Mr. Gilbert—I have learned from an experiment that if you feed hens on rotten food, the eggs they produce will decay very quickly.

Q.—How many feet of floor would you give to a hen ?

Mr. Gilbert—From 4 to 6 feet and from 6 to 8 feet high.

Q.—What temperature would you have a hen house ?

Mr. Gilbert—Just hot enough to keep water from freezing.

REPORT OF EXPERIMENTS IN AGRICULTURE.

Mr. C. A. Zavitz, B.S.A., Secretary of the Committee on Agricultural Experiments, gave the following report:

During the past six years the co-operative experiments in agriculture have increased more than fifty fold, and in 1891 upwards of 2,500 plots were used for these tests over Ontario. Much care has been taken to select only such experiments as would, in the estimation of the Committee, be of the greatest practical value to the experimenters. These co-operative tests are being conducted not only by ex-students of the College, but also by an increasing number of other Ontario farmers. The very best men are wanted, whether they be ex-students or otherwise, and we are pleased to notice that some of the most careful, most progressive and most successful farmers throughout the province have joined in the work with a considerable amount of enthusiasm. It has been the aim of the Committee on Agricultural experiments to extend a hearty welcome to those desiring to co-operate with us in this important feature of our Association work.

Soon after the annual meeting of the Association in 1891, the following circular was forwarded to the forty-three county secretaries asking for names of all the ex-students located in their respective counties, and also for the names of some of the other leading farmers.

Ontario Agricultural College, Guelph, Feb. 15th.. 1891.

Dear Sir,—At a meeting of the Ontario Agricultural and Experimental Union held at the College on the 5th and 6th inst., a motion was carried that an ex-student be appointed in each Ontario county to act as secretary for his county; and you were elected for your district by a unanimous vote of the meeting.

We are pleased to inform you that we are preparing to introduce into every township of this province material for experiments with promising varieties of grains and roots, and perhaps some with fertilisers, rass seed, lucerne, etc. This material is to be sent free to all those who undertake an experiment; and instructions for conducting the same, with blank forms on which to report results, will be furnished. These experiments will not be difficult to conduct properly, but will need care ; and we feel assured that they will far more than repay for the time and labor expended by those who conduct them, as the produce of the plots becomes the property of the experimenters.

Will you be so kind as to fill out the enclosed blank sheet with names of persons located in your county as follows :—

(1) Names and P. O. addresses of all the ex-students in each township.

(2) Names and P. O. addresses of one or two of the most careful farmers, not ex-students, in each township, *in which there are less than two ex-students.*

This will give us the names of two persons at least from each township. You need simply to supply us with the names ; and then we will write them, asking if they desire to undertake an experiment and if so to give us their choice of the experiments.

Please return to us the names as soon after the 1st of March as possible. By being prompt in this matter, you will confer a favor upon the Union and upon the county which you represent.

After receiving replies from nearly all the secretaries, a letter giving the proposed experiments for 1891, was addressed to about eight hundred persons. As the material for some of the tests was limited in supply the information regarding these tests was first sent to the members of the Association, and in four days later to all others. The applications were then filled in the order received and according to request as long as material lasted.

The following is the letter of invitation sent out :

O. A. College, Guelph, March, 1891.

Dear Sir,—The members of the Ontario Agricultural and Experimental Union, along with other interested farmers over Ontario, are carrying out a system of co-operative experiments in agriculture. This work was started, upon the present plan, in the spring of 1886 with twelve experimenters, who were willing to receive the grains and fertilisers, carry out the necessary instructions, and report the results at the close of the season. For the first two or three years the experiments were confined almost entirely to the ex-students of the Agricultural College, but as many other farmers expressed a desire to join in the work the invitation was extended to them also, and material was sent free to those who applied, on the condition that they would be careful to follow the few necessary instructions and report results of their work after harvest. The number of both the experimenters and the experiments have steadily increased since the commencement, insomuch that during the past season between five and six hundred plots over Ontario were used for these tests.

The members of the Committee on Agricultural Experiments are pleased to state that for 1891 they are preparing to introduce into every township of Ontario material for experiments, with fertilisers, lucerne, and promising varieties of roots and grains. Upwards of five hundred varieties of roots and grains were tested at the Experimental Station, Guelph, during the past year, consisting of nearly all the Ontario varieties and about three hundred new varieties imported during the past four years from different parts of Europe, Asia, Africa, New Zealand, and the United States. Some of these varieties are certainly very promising and are now in sufficient quantities for a limited distribution.

The experiments chosen for 1891 are as follows :

No. of Experiments.	Names of Experiments.	Number of plots required for each.	Size and shape of each plot.
1	Testing superphosphate, dried blood, and scraps, farm yard manure and no manure with oats	4	2 rods x 2 rods.
2	Comparing the advantage of nitrate of soda over no fertiliser with spring wheat	2	2 rods x 1 rod.
3	Ascertaining the relative value of planting corn in hills as against drills	2	4 rods x 2 rods.
4	Growing lucerne as a crop for fodder	1	4 rods x 4 rods.
5	Testing six promising varieties of corn	6	1 rod x 1 rod.
6	Testing five promising varieties of turnips	5	" "
7	Testing five promising varieties of mangels	5	" "
8	Testing five promising varieties of carrots	5	" "
9	Testing six promising varieties of spring wheat	6	" "
10	Testing six promising varieties of barley	6	" "
11	Testing six promising varieties of oats	6	" "

Prosperous farmers need not find much difficulty in conducting any of these experiments successfully, but care will certainly need to be exercised in every instance, and where this is done the Committee feels assured that the experimenters will be far more than repaid for time and labor expended. Each experimenter will glean information from his own work and also have the benefit of the reports of similar experiments from other parts of Ontario. The results of carefully conducted experiments are presented at the annual meeting of the Association, held at the Agricultural College, Guelph, and are afterwards printed in its annual report. Each experimenter is invited to the meeting and a copy of the Union report will be forwarded to his address.

A sheet of instructions for the work and blank forms in which to report results or the tests will be furnished to each experimenter at the time the fertilisers and seeds are forwarded. All material is sent entirely free of charge to each farmer who wishes to join in the work. The produce of the plots, of course, becomes the property of those who conduct the experiments.

Each person is allowed to choose any one of the eleven experiments mentioned above, for which the material will be furnished until our limited supply becomes exhausted, hence those who apply first will be the surest of the desired outfit.

Those desiring to conduct an experiment during 1891 will kindly apply to the secretary of the Committee as soon as possible, that the material may reach them in good time for seeding. The nearest express office to those applying for fertilisers should be mentioned.

The applications for these tests were numerous, and much care was taken to send the material exactly as requested, but as the grain supply was limited, in some instances a few of the late orders could not be filled. The greatest demand was for oats, the next was for spring wheat, and the next was for corn and barley.

Sufficient material was sent out for the following number of plots : Fertilisers, 70 ; lucerne and corn, 196 ; roots, 360 ; spring grain, 1,026.

These eleven experiments were all carefully conducted at this Experiment Station, and the reports of the nine successful tests are now ready, and are placed among these from over the province.

On the whole we have had a fairly good year of co-operative work. Failures in various instances may be expected from experiments of this kind. In the report we have only included the results of those tests in which were given the full weights of the produce of *every* plot. By so doing the *average results* are of much more value than if partial reports were sometimes included.

The following letter was placed at the top of the sheet containing the instructions and blank forms as sent to each experimenter :

O. A. College, Guelph, March 30th, 1891.

Dear Sir,—Your reply to our letter regarding the co-operative experiments for Ontario during 1891 has been received. We wish to inform you that we are forwarding to your address the material for the experiment or experiments which you chose from the list in the letters we sent to you. If you have asked for fertilisers, they are addressed to your nearest express office ; but if you have desired seeds or grains without any of the fertilizers, they are forwarded to you by post. This sheet gives the "instructions" for conducting, and the "blank forms" on which to report the results of the different experiments with fertilizers, fodder crops, roots and grains. Should you desire any further information regarding your experimental work, kindly write us to that effect.

For each experiment, soil of a uniform character should be chosen, and the plots should be so located that there would be no danger of trespassing by poultry, etc. The preparation of the soil should be similar to that for the same crops in the larger fields.

We hope the material which we are now forwarding will reach you safely, and that you will have good success with your experimental work.

The following gives (1) the instructions, (2) the individual tests, (3) the average results, and (4) the comments by experimenters of each of the eleven co-operative experiments in agriculture carried on over Ontario during 1891.

No. 1.—SUPERPHOSPHATE, DRIED BLOOD AND SCRAP, FARMYARD MANURE AND NO MANURE WITH OATS.

(1) Mark off four plots of one-fortieth of an acre each, leaving a clean path two feet wide between the plots. Two rods square is the size recommended.

(2) Treat all plots alike as regards cultivation of ground, etc., and sow the packages of white bonanza oats upon the four plots, as indicated by the labels on the bags, aim at seeding one inch deep, and cover the seed by going crosswise over the plots with a light harrow, or by using a hand rake.

(3) Apply the 10 lb. of superphosphate to plot No. 1 ; the 10 lb. of dried blood and scrap to plot No. 2 ; upon No. 3 plot use 700 lb. of farmyard manure, and leave No. 4 plot without the addition of any fertilising material. Apply the fertilisers at the time of seeding.

(4) When the plants are three or four inches high, cut off those outside of the plot limits.

(5) Your safest method of harvesting would probably be to cut the crops with a cradle after the oats have become sufficiently ripened, and then when properly dried, thresh with a flail.

Reports from six experimenters.

Experimenter.	County.	Nature of soil.	Previous cropping.	Weight of grain on plot.			
				Plot 3	Plot 1	Plot 2	Plot 4
				lb.	lb.	lb.	lb.
Geo. Lott	Lennox	Dark sandy loam	Potatoes	45	51	48	46
F. Ruddell	Halton	Gravelly loam	Oats and wheat	33	20	25	28
Jno. Darby	Parry Sound	"	Oats	5	7¾	8¼	3
Walter Clapp	Prince Edward	Clay	Fall wheat	30	40	35	25
R. R. Sangster	Glengarry	Clay loam	Corn	39½	49½	42½	35½
O. A. College	Wellington	"	Wheat	55⅛	36⅝	$39\frac{13}{16}$	$38\frac{13}{24}$
Average yield per plot (lb.)				34. 6	34. 0	33. 0	29. 3
" of grain per acre (bush.)				40. 7	40.2	39. 0	34. 4
" straw " (tons)				1.18	1.20	1.36	1.12
Average length of plants (inches.)				41. 3	42. 0	42. 3	40. 3

NOTE.—The superphosphate cost $26 per ton, and the dried blood and scrap $40 per ton.

There was but little difference in the crops from the different fertilisers regarding earliness of maturity, strength of straw and amount of rust.

NO. II.—APPLICATION OF SODIUM NITRATE TO SPRING WHEAT.

(1) Measure out two uniform plots each two rods square, and leave a path two feet wide between the plots.

(2) Sow the two packages of Manitoulin spring wheat upon the two plots as indicated by the labels on the bags. Cover seed similar to directions for Experiment No. 1 (2).

(3) Sow the sodium nitrate on plot No. 1 when the plants are about two inches high, and leave plot No. 2 without the application of any fertiliser.

(4), (5) and (6) same as Experiment No. 1.

Reports from five experimenters.

Experimenter.	County.	Nature of soil.	Previous cropping.	Weight of grain per plot.	
				No fertiliser.	Nitrate of soda.
				lb.	lb.
R. R. Sangster	Glengarry	Clay loam	Corn	71	81
Walter Clapp	Prince Edward	Clay	Fall wheat	16	14
Thos. Wheatley	Grey	Clay loam	Peas	16	15
J. G. Cowie	Haldimand	"	Corn	24	28
Walter Hartman	Grey	"		34	22
Average yield per plot (lb.)				32.2	32.0
" of grain per acre (bush.)				21.5	21.3
Average length of plants (inches.)				39.5	42.2
Percentage of experiments having no rust				75	60

NO. III.—CORN CULTIVATION, DRILLS VERSUS HILLS.

(1) Measure off two uniform plots, each exactly two rods wide by four rods long. Leave sufficient space between the plots for a horse to turn when cultivating the crop.

Aim at having the seeding done in one day

(3) Put in the seed as follows:

No. 1 plot—(*a*) Plant the corn in eleven drills, each four rods long. (*b*) Allow three feet space between each two consecutive drills. (*c*) Drop the kernels in the row at an average distance of 4½ inches apart. (*d*) When the plants are about 5 inches high, thin them to an average of 9 inches in the row.

No. 2 plot—(*a*) Plant the corn in eleven rows of hills, making each row four rods long. (*b*) Allow three feet space between the hills each way. (*c*) Drop 8 kernels in each hill. (*d*) When the plants are about 5 inches high, thin out, leaving exactly four plants per hill.

(4) Cultivate the crop when necessary, and take notes for report.

(5) Cut each crop at the time when its condition corresponds to the roasting condition of field corn, or when the ears are in the glazed state.

(6) Weigh produce from plots under as equal conditions as possible.

Reports from two experimenters.

Experimenter.	County.	Nature of soil.	Previous cropping, 1891.	Weight of whole crop per plot.	
				Drills.	Hills.
				lb.	lb.
R. R. Sangster	Glengarry	Clay loam	Peas	1452	1400
C. R. Stephenson	Elgin			1256	1082
Average weight per plot (lb)				1354	1241
Average yield per acre (tons)				10.83	9.93

NO. IV.—THE GROWING OF LUCERNE.

(1) Select a one-tenth acre plot, conveniently situated to the stables, and in such a position that it may remain unbroken a number of years.

(2) Cultivate the ground thoroughly, making a fine seed bed.

(3) Sow one-tenth bushel of your own barley on the plot and seed with the 1.8 lb. lucerne in the same way you would seed with red clover.

(4) If there is a heavy crop of lucerne in the autumn, cut high; if the crop is light, leave uncut.

Reports from ten experimenters.

Experimenter.	County.	Quality of soil.	Wet or dry soil	Previous cropping.	Remarks.
D. D. Springstead	Lincoln	Black clay	Dry	Potatoes	Did well after barley was cut, reaching about 4 in.
James B Muir	Bruce	Clay loam	Dry	Fodder corn	Lucerne did not make a strong fall growth owing to heaviness of cereal crop
W. Quinn	Muskoka	Sandy loam	Dry	Potatoes	Very little growth.
Enos Remmer	Ontario	Heavy clay	Dry	Clover	Thin on ground, about 1 ft. tall.
J. W. Springstead	Lincoln	Heavy clay	Dry	Potatoes	Made wonderful growth after barley was cut.
J. D. Smith	Durham	Light sand	Dry	Corn	
G. G. Shirreffs	Russell	Medium	Medium	Beans	Thick on ground and about 6 in. high.
Geo. Swan	Muskoka				The lucerne was smothered out by the barley all laying down.
Elmer Lick	Ontario	Cl'y and mu'k	Part wet and part dry	Buckwheat.	Some of the plants were about 18 in. high, but majority were only about 6 in.
O. A. College	Wellington	Clay loam	Dry	Winter wheat	Good growth, even crop, plants about 15 in. tall in autumn.

NO. V.—TESTING SIX PROMISING VARIETIES OF CORN.

(1) Measure off six plots each one rod square.

(2) Mark out each plot into five rows both ways, allowing in every case 3 feet 4 inches between each two consecutive rows.

(3) Plant each variety of corn upon its respective plot. Drop six kernels at each of the places where the lines touch, and thus make twenty-five hills of each variety.

(4) When the corn is about four inches high, thin out to four plants per hill.

(5) Cultivate all the plots alike and take necessary notes during the summer for the report.

(6) Cut each variety before frost and at the time when its stage of growth corresponds to the roasting condition of field corn, or when the ears are in the glazed state.

Set 1.—Reports from four experimenters.

Experimenter.	County.	Nature of soil.	Previous cropping, 1891.	Mammoth White Surprise.	Mammoth Cuban.	Mammo'h Southern Sweet.	Salzer's South Dakota.	Canada Yellow.	Salzer's North Dakota.
				lb.	lb.	lb.	lb.	lb.	lb.
Henry Percy ...	Elgin ...	sandy	clover sod.....	480	351	280	300	275	290
Geo. Amos.....	Halton	clay loam	mangels	530	370	416	325	344	296
J. D. Smith	Durham...	light sand.....	buckwheat	126	102	119	85	80	73
O. A. College...	Wellington	clay loam......	roots	313	230	191¾	168¾	150¾	173¾
Average weight per plot				362⅝	263¼	251 11/16	219 11/16	212 7/16	208 3/16

Set 2.—Reports from four experimenters.

Experimenter.	County.	Nature of soil.	Previous cropping.	Chester County Mammoth.	Thoroughbred White Flint.	Mammoth Southern Sweet.	Giant Prolific Sweet Ensilage.	Angel of Midnight.	Compton's Early.
				lb.	lb.	lb.	lb.	lb.	lb.
W. D. Harkness.	Dundas ...	gravelly loam..	corn	410	370	325	300	215	245
Geo. S. Hull ..	Middlesex.	clay loam......	carrots	307	154	207	200	98	86
R. R. Saogster.	Glengarry .	clay loam......	peas	346	275	310	320	224	200
O. A. College...	Wellington	clay loam.. ..	roots	247¾	292½	204	218½	200½	178
Average weight per plot				327 11/16	272⅞	261½	259⅝	184⅜	177¼

Set 3.—Reports from two experimenters.

Experimenter.	County.	Nature of soil.	Previous cropping.	Blunt's Prolific.	Mammoth Southern Sweet.	Wisconsin Earliest White Dent.	Hickory King.	Golden Dew Drop.	Self Husking.
				lb.	lb.	lb.	lb.	lb.	lb.
Edward Jeffs...	Simcoe	sandy loam....	fall wheat......	336	330	310	282	161	128
O. A. College...	Wellington	clay loam.....	roots	234¼	206	204½	232	150½	173
Average weight per plot				285⅛	268	257¼	257	155¾	150½

Average results of ten experiments.

Variety.	Class of corn	Condition of grain at time of cutting.	Average height at time of cutting.	Average yield per acre of whole crop. (Estimated from plots.)	Average percentage of ears in the whole crop. (Weighed when green).
			ft.	tons.	
Mammoth White Surprise	White Dent	very immature	12.0	29.01	11.2
Mammoth Cuban	Yellow Dent	mature	9.8	21.06	22.1
Mammoth Southern Sweet	White Dent	immature	9.8	20.71	17.9
Salzer's South Dakota	Yellow Flint	mature	7.9	17.57	23.3
Canada Yellow	Yellow Flint	mature	8.1	16.99	23.8
Salzer's North Dakota	White Flint	mature	7.7	16.65	24.3
Chester County Mammoth	Yellow Dent	very immature	10.0	26.21	15.3
Thoroughbred White Flint	White Flint	immature	8.1	21.83	20.0
Giant Prolific Sweet Ensilage	White Dent	immature	9.6	20.77	25.1
Angel of Midnight	White Flint	mature	7.1	14.75	21.3
Compton's Early	Yellow Flint	mature	7.7	14.18	34.2
Blunt's Prolific	White Dent	very immature	9.7	22.81	1.1
Wisconsin Earliest White Dent.	White Dent	nearly mature	9.0	20.58	18.1
Hickory King	White Dent	immature	10.2	20.56	1.4
Golden Dewdrop	Yellow Flint	mature	6.7	12.46	21.5
Self Husking	Red Flint	mature	6.2	12.04	24.3

NO. VI.—COMPARATIVE TESTS OF FIVE LEADING VARIETIES OF TURNIPS.

(1) Five plots, each containing 198 square feet, are required for the experiment with turnips.

(2) Every two consecutive drills for the roots should be twenty-five inches apart.

(3) Make all plots alike and arrange each plot according to one of the following plans: (*a*) Eight drills, 16 feet four inches long or (*b*) four drills, 32 feet eight inches long; or (*c*) two drills, 65 feet 4 inches long.

(4) Sow the different varieties upon their respective plots.

(5) Thin young plants in the rows to the following distances: Mangels and turnips, 10 inches apart; carrots, 4 inches.

(6) Be careful of the plants when cultivating and hoeing the ground.

NOTE.—The above instructions answer also for experiments Nos. VII and VIII.

Reports from six experimenters.

Experimenter.	County.	Nature of soil.	Prevoius cropping.	Weight of Turnips on plot.				
				Carter's Elephant.	Fettecairn Green top.	Skirving's Swede.	Red Globe Norfolk.	Orange Jelly.
				lb.	lb.	lb.	lb.	lb.
A. Wiancko	Muskoka	clay	roots	439	461	347	295	235
No name		gravelly loam	oats	257	250	221	330	206
Geo. Swan	Muskoka	loam	potatoes	936	780	680	837	690
Josiah Hallman	Waterloo	clay loam	permanent pasture.	365	391	348	119	133
G. G. Shirreffs	Russell	sandy loam	oats	570	500	600	486	330
O. A. College	Wellington	clay loam	winter wheat	305	284	299	328	265
Average yield per plot				479	444	416	399	310

Average results of six experiments.

Varieties.	Class of roots.	Labor of removing turnips from soil.	Average weight per root.	Average yield per acre. (Estimated from plots.)
			lb.	Tons.
Carter's Elephant	Swede turnip	easy	3.07	38.2
Fettecairn Green Top	Swede turnip	medium	2.76	35.5
Skirving's Swede	Swede turnip	hard	2.45	33.8
Red Globe Norfolk	Fall turnip	easy	2.95	31.8
Orange Jelly	Fall turnip	easy	1.90	24.8

NO. VII.—COMPARATIVE TESTS OF FIVE LEADING VARIETIES OF MANGELS.

Reports from eleven experimenters.

Experimenter.	County.	Nature of soil.	Previous cropping.	Weight of Mangels on plot.				
				Mammoth Long Red.	Mammoth Yellow Intermediate.	Yellow Globe.	White Silesian.	Red Globe.
				lb.	lb.	lb.	lb.	lb.
A. Wiancko	Muskoka	clay	roots	457	345	214	280	278
F. Ruddell	Halton	sand	potatoes	323	390	202	385	191
Robt Wilson	Glengarry	light loam	oats	616	770	630	452	459
H. H. Macklem	Russell	loam	rye	720	229	296	243	532
J. H. Spencer	Prince Edw'd	black loam	corn	125	196	116	168	106
Geo. North	Wellington	light clay loam	oats	195	170	120	150	75
				145	117	95	83	65
Geo. Swan	Muskoka	loam	potatoes	775	665	683	647	750
		clay loam	corn	216	175	200	154	186
R. R. Sangster	Glengarry	clay loam	oats	503	490	425	400	351
O. A. College	Wellington	clay loam	fall wheat	466	295	276	295	255
Average yield per plot				413	349	296	296	295

Average results of eleven experiments.

Varieties.	Class of roots.	Labor of removing the roots from soil.	Average weight per root.	Yield of roots per acre.
			lb.	tons.
Mammoth Long Red	Mangel	medium	3.47	33.4
Mammoth Yellow Intermediate	"	easy	3.32	27.9
Yellow Globe	"	"	3.05	23.7
White Silesian	Sugar Beet.	hard	2.37	23.7
Red Globe	Mangel	easy	2.87	23.5

NO. VIII.—COMPARATIVE TESTS OF FIVE LEADING VARIETIES OF CARROTS.

Reports from seven experimenters.

Experimenter.	County.	Nature of soil.	Previous cropping.	Weight of Carrots on plot.				
				Improved Short White.	Long White Belgian.	Danvers Orange.	Long Orange.	Mitchell's Perfected.
				lb	lb.	lb.	lb.	lb.
A. Wiancko	Muskoka	clay	root	3.35	1.26	1.32	1.85	1.18
E. Remmer	Ontario	heavy clay	clover	2.21	2.10	1.49	1.37	1.73
R. R. Sangster.	Glengarry	clay loam	oats	3.33	2.90	2.40	1.97	1.88
Mathew Richardson	Haldimand	clay loam	corn	1.80	1.30	1.20	1.20	50
N. C. Brown	Elgin.	sandy loam.	potatoes	3.93	3.30	2.85	3.00	3.30
G. G. Shirreffs	Russell	sandy loam.	potatoes	1.60	1.67	1.34	1.18	1.20
O. A. College	Wellington	clay loam	winter wheat	3.16	3·06	1.61	1.60	1.62
Average yield per plot				2.77	2.23	1.74	1.74	1.63

Average results of seven experiments.

Varieties.	Shape of roots.	Labor of removing roots from soil.	Average weight per root.	Yield per acre.
			lb.	tons.
Improved Short White	short	easy	0.82	22.2
Long White Belgian	long	medium	0.59	17.8
Danvers Orange	long	easy	0.49	13.9
Long Orange.	long	hard	0.42	13.9
Mitchell's Perfected	short	easy	0.49	13.0

NO. IX.—COMPARATIVE TESTS OF SIX PROMISING VARIETIES OF SPRING WHEAT.

(1) Select a portion of uniform soil and mark off six plots, each one rod square. Allow a path two feet wide between each two consecutive plots.

(2) Drive stakes at the four corners of each plot.

(3) Sow the different varieties upon their respective plots. It is an advantage to run a strong cord around each plot and sow inside the line.

(4) After the grain is up three or four inches, again run the cord around each plot and cut off any plants that happen to be outside the line.

NOTE.—These instructions apply also to experiments Nos. X and XI.

SET 1 —Reports from six experimenters

Experimenter.	County.	Nature of soil.	Previous cropping.	Weight of grain on plot.					
				Red Fern.	Manitoulin.	Herison Bearded.	Colorado.	Rio Grande.	Sorentino.
				lb.	lb.	lb.	lb.	lb.	lb.
Thos. H. Watson	Victoria	clay loam	turnips	13	12½	13	13	12½	10
Jno. Watson	Ontario	loam	potatoes	12	12	12	13	12	7
Henry Coben	Peterboro'	sandy	vegetable—garden	6½	7½	5	6	4	3
Jas. White	Grey	clay loam	fall wheat	6	5	7	5½	6	5
Chas. Young	Algoma	deep sandy loam	peas	9½	8½	4¾	4	6½	4½
O. A. College	Wellington.	clay loam	fall wheat	12¼	11¾	11¾	9¾	9½	7¼
Average yield per plot				9.87	9.54	8.92	8.54	8.37	6.12

SET 2.—Reports from eighteen experimenters.

Experimenter.	County.	Nature of soil.	Previous cropping.	Weight of grain on plot.					
				Holben's Improved.	Herison Bearded.	Rio Grande.	Manitoulin.	Red Fern.	Pringle's Champion.
					lb.	lb.	lb.	lb.	lb.
Thomas Wheatley	Grey	clay loam	peas	6	4	5	7	5	4
Jas. Fair	Durham	clay loam	white beans	5	6	5⅞	5	2	3
R. W. Hermon	Prince Edward	clay loam	fallow	3¼	3⅛	3	3 5/16	2 15/16	2⅜
Moses Doolittle	Ontario	clay loam	barley	16	13	16	17	10	15
Jas. Watson	Victoria	clay	loam	8	10	8¾	8½	9	7⅓
Geo. Kennedy	Lincoln	clay	timothy sod	4¾	4⅓	3¼	4⅓	4	4
Wm. G. Milson	Grey	light	turnips	7¼	3⅔	5½	4¼	6¾	5½
Jno. G. McKay	Bruce	clay loam	fall wheat	5½	3¼	3	4½	2	2
Fred Davidson	Peterboro'	sandy loam	wheat	6½	6	7	6	8	7
A. Wiancko	Muskoka	strong loam	potatoes	5	3⅓	5	4½	3½	5
Jas. Stocks	Ontario	clay	oats	9	8¾	8½	8	10	9¼
Geo. S. Hull	Middlesex	clay loam	potatoes	14	17½	13	14½	16	15
Wm. Doyle	Carleton	sandy loam	carrots	14	16	14½	13	14	13½
No name				7¾	4½	6¼	5½	7¼	5¾
Wm. Mowbray	Lambton	black ash swamp	oats	8	10	6½	7⅓	6¼	6½
Thomas Gallanger	Simcoe	clay loam	barley	4⅓	4⅓	5¼	5	5	4¾
R. R. Sangster	Glengarry	gravelly loam		22⅓	21¼	21	19	19	20
O. A. College	Wellington	clay loam	fall wheat	11¾	11¾	9¾	11¼	12¼	13¼
Average yield per plot				8.8	8.4	8.2	8.2	7.9	7.9

Average results of twenty-four experiments.

Varieties.	Number of tests.	Length of plant when standing.	Percentage of experiments free from rust.	Strength of straw.	Yield of straw per acre.	Yield of grain per acre.
		inches.			tons.	bush.
Holben's Improved	18	39.7	78.9	strong	1.67	23.5
Herison Bearded	24	38.1	57.9	weak	1.25	22.8
Rio Grande	24	41.8	55.0	medium	1.38	22.0
Manitoulin	24	39.3	75.0	strong	1.27	22.8
Red Fern	24	41.1	73.7	strong	1.39	22.4
Pringle's Champion	18	38.3	68.2	medium	1.25	21.1
Colorado	6	37.4	81.8	medium	1.25	22.8
Sorentino	6	36.3	75.0	weak	.94	16.3

NO. X.—COMPARATIVE TESTS OF SIX PROMISING VARIETIES OF BARLEY.

Average results of thirteen experiments.

Varieties.	Class of grain.	Length of plant.	Strength of straw.	Yield of straw per acre.	Yield of grain per acre.
		inches.		tons.	bush.
Common 6 rowed	6 rowed	30.5	medium	1.13	38.7
Hungarian (Hulless)	6 "	30.9	strong	.98	37.0
Cheyne	2 "	31.5	medium	1.31	36.3
New Zealand Chevalier	2 "	31.6	strong	1.26	33.0
Oderbrucker	6 "	29.4	strong	1.06	32.0
Black Hulless	6 "	25.2	weak	.92	30 7

Reports from thirteen experimenters.

Experimenter.	County.	Nature of soil.	Previous cropping.	Weight of grain on plot.					
				Common six rowed.	Hungarian.	Cheyne.	New Zealand Chevalier.	Oderbrucker.	Black Hulless.
				lb.	lb.	lb.	lb.	lb.	lb.
A. Wiancko	Muskoka	strong loam	wheat	9	10	7	8	9½	8
Conrad Gies	Waterloo	clay loam	wheat	11¾	9¾	10	8¼	9⅝	9
D. P. Campbell	Glengarry	gravelly loam	pasture	10	8½	7½	6	8¾	6
P. S. McLaren	Lanark	sandy loam	buckwheat	15	18	13½	14½	14	12
Robt. Foster	Dufferin	sandy loam	potatoes	7½	7	6½	6	8	5
R. E. King	Haldimand	clay	hay	2¼	2	2	1¾	2½	1¾
J. M. Drummond	Peterboro'	clay loam	peas	9	6	4	4	5	9
H. C. Brown	Elgin			8¾	5	5	5	6	4
A. Sanderson	Peterboro'	clay loam	potatoes	9	9½	4	5½	4½	4
R. R. Sangster	Glengarry	clay loam	peas	20	21	23	25	16	15
J. B. Stone				15	13⅛	8¾	5¼	10⅘	11¼
Duncan Williamson	Lambton	sandy loam	potatoes	20	22	34	24	18	23
O. A. College	Wellington	clay loam	fall wheat	13¼	13	15⅞	15⅜	13½	11⅓
Average yield per plot				11.6	11.1	10.9	9.9	9.6	9.2

NO. XI.—COMPARATIVE TESTS OF SIX PROMISING VARIETIES OF OATS.

Set 1. Reports from twenty-two experimenters.

Experimenter.	County.	Nature of soil.	Previous cropping.	Weight of grain per plot.					
				Portland White.	Bavarian.	Joanette Black.	Flying Scotchman.	White Bonanza.	White Tartarian.
				lb.	lb.	lb.	lb.	lb.	lb.
A. Wiancko	Muskoka	strong loam	barley	8½	9	9½	9	10	8½
J. B. Aylesworth	Addington	sandy loam	meadow	12	8½	10½	7¾	8½	9
Wm. S. Morrison	Haliburton	clay loam	new fallow	13½	10¼	18¼	10⅝	11⅝	11
M. Clipham	Muskoka	clay loam	corn	13	11	13¾	11	10	11½
Wm. McKenzie	Perth	clay loam	corn	22	28	13	29	16	17
A. Halliday	Essex	clay loam	oats	12	6	6	6	6	3½
R. E. King	Haldimand	clay loam	hay	8½	4	6	3	3¼	7
Jas. Stocks	Ontario	clay	roots	15	13	11¼	10¼	12	12
Jas. Henderson	Dundas	sandy loam	potatoes	13	12	5	12	12	13
Jno. Hunter	Lambton	clay		17	16	15	16	17	16
Elmer Lick	Ontario	gravelly loam	turnips	14	12¼	14	12⅛	11⅞	12⅝
Allen Schantz	Waterloo	clay	fall wheat	11	9⅝	13	9¼	9⅛	7⅞
Frank Shuh	Waterloo	sandy loam	oats	14½	12	11	10½	10	10½
R. J. Wade	Middlesex	clay loam	oats	15	16	15	21	15	16
Geo. North	Wellington	light clay lo'm	rape	30	30	20	20	25	10
A. P. Robinson	Simcoe	loam	potatoes	8½	10	6½	9½	6½	7
Chas. Groat	Ontario		barley	9	9	16	8½	13	14½
Thos. Graham	Carleton	clay loam		15	18½	17	14	13½	18¼
Geo. Bailey				8½	8	8	7½	6	7
Moses Harvey	Perth	clay loam	clover loam	26	24	26	25	33⅓	27
R. Morris	Norfolk	sandy loam	clover	7	8	8	11	7	7
O. A. College	Wellington	clay loam	fall wheat	14 6/11	17¾	14⅝	13 6/11	12¼	20⅝
Average yield per plot				14.0	13.3	12.6	12.6	12.2	12.1

Set 2. Reports from fourteen experimenters.

Experimenter.	County.	Nature of soil.	Previous cropping.	Weight of grain on plot.					
				Waterloo.	Banner.	Probsteier.	White Tartarian.	Black Etampes.	White Bonanza.
				lb.	lb.	lb.	lb.	lb.	lb.
Wm. Ruddell.	Grey	clay loam....	hay..	9	10½	8¾	8	6	6
John Facey	Oxford	clay loam....	fall wheat..	15¾	8¾	11½	11¼	16½	13¼
Geo. A. Bratt	Essex	clay loam....	clover	15	12¼	16	14	13	15½
C. Wilson..........	York	loam	oats . ..	12½	14	15	13	10	14
H. Coben	Peterboro....	sandy	meadow ...	8	10½	11	11½	9½	8½
Josiah Hallman	Waterloo	clay loam....	rye	19½	17½	18	20	18	17½
Nelson Monteith....	Perth........	clay loam....	corn	13	14½	12	11	11	9
Geo. Swan.........	Muskoka	loam	peas	15	16	17	17	18	6
Arthur Thom......	Dundas	gravelly loam.	potatoes ..	14	16½	15	17	15	16
Jno. Pierson........	Bruce	clay loam....	potatoes ..	14	11	9	9	9	10
J. McNaughton . ..	Simcoe	sandy loam ..	potatoes ...	16	13	16	13	13	
Jno. S. Kerfoot.....	Simcoe	clay	peas	21	15½	14	11¾	14¾	5
D. S. Thompson....	Simcoe	clay loam....	wheat......	31	33	29	27	31½	19
O. A. College.......	Wellington...	clay.	wheat.. ...	18¼	19½	17	20½	17½	12¼
Average yield per plot				15.2	15.2	14.9	14.5	14.4	10 9

Average results of thirty-six experiments.

Varieties.	Color of grain.	Length of plant.	Percentage of experiments having no rust.	Strength of straw.	Yield per acre. (estimated from plots.)	
					Straw.	Grain.
		inches.			tons.	bush.
Poland White..	white......	42 7	85.7	strong......	1.35	65.9
Bavarian	white	43 5	85 7	strong......	1.38	62.7
Joanette Black........ ...	black	32.8	80.9	medium....	1 46	59 3
Flying Scotchman.... ...	white	44 7	89.4	strong.. .	1.26	59.3
White Bonanza	white	43 2	80.1	strong......	1.27	55.0
White Tartarian	white......	44.2	73 6	strong......	1 58	61.3
Waterloo.....	white.....	40.0	71.4	strong.. .	1 44	71.5
Banner.	white......	42.6	78 6	strong......	1.40	71.5
Probsteier...............	white ...	41.7	78.6	strong......	1.36	70.1
Black Etampes	black......	33.5	85 7	medium....	1.37	67.8

WINTER WHEAT TEST.

One thousand packages of winter wheat were sent out over Ontario during the past autumn as Union Experiment No. 12 for 1891. This test includes some thirty-seven varieties and will be reported on next year. Experimenters are requested to report on or about August 1st, 1892.

THE FUTURE OF SHEEP HUSBANDRY IN CANADA.

By Hon. John Dryden, Minister of Agriculture, Toronto, Ont.

Sheep combine in their products two essential requirements for the comfort and well-being of society, meat, which sustains the human body, and wool, which when manufactured, affords warmth and protection. Changes will take place the world over, fashions may come and go, kingdoms rise and fall, but always men must eat, and therefore meat will always be in demand; the human body will continue to need protection and therefore wool will be required; so that so long as man exists on this earth, sheep husbandry will have a place. Just how much of these two products will be consumed depends somewhat upon whether the producers will undertake to supply the particular quality of either demanded by the consumer. For many years in the United States only one of these products was thought worth considering, and thousands of sheep were kept only for the wool annually produced, the carcases when old being left to the birds and beasts of the forest. Changes in the market in time caused a less demand for the particular kind of wool being then produced, resulting in these latter years in eliminating entirely the profits in this particular line of sheep husbandry; so that to-day but few men contemplate the raising of sheep as a business without considering the possibilities of combining these two elements in the production of sheep, namely, meat and wool.

That two profits may be thus obtained is perfectly clear. The same carcase which produces a suitable quality of wool may, by judicious breeding and management, be brought to afford the finest quality of flesh as well. The difference thus obtained will in most cases be sufficient to convert an absolute loss in the industry in the one case to a decided profit in the other. The sheep which combine value in these two products to the greatest extent will undoubtedly be the sheep found in Canada in the future.

The time is approaching when it will be impossible to sell at a remunerative price an animal having merely the name of sheep regardless altogether of the quality either of meat or wool, and the sooner that time comes in this country, the better for all concerned. A discriminating market is the best of all markets to improve production. So long as persons will purchase inferior animals at the same rate as those of a superior quality, so long will carelessness and indifference be manifested by those engaged in their production. The moment the consumer obtains sufficient knowledge of what ought to be furnished for his consumption to refuse absolutely to purchase that which is entirely inferior and unfit for his use, that moment he becomes in the highest degree an educator of those engaged in any given industry, and will eventually compel them to quit the production altogether or furnish what is demanded. There will never come a time when meat will cease to be consumed; somebody will always sell this product. But there will come a time when the inferior will go a-begging; when the man who produces only this quality will have to hunt for a customer and take whatever he is willing to give.

A good animal of any breed or kind will sell sell itself—will find its own market. It will command attention when that which is bad is ignored and neglected. When the market is overstocked, who is it that still sells at a paying price? It is the man who in the midst of dullness has still had an eye to perfection in his animals; who has never looked back but has pursued an even course toward high merit from the beginning, no matter what his circumstances as to market may have been; it is the man who has not studied so much what he is to receive, but who has been concentrating his powers on the production of animals of suitable merit.

There are those, and their number is too great, who, when the market drops, begin at once to lose interest in the quality of their animals, and who forthwith say, "Anything will do; there is nothing in it anyway." Whereas they should redouble their energies, if possible, in the opposite direction. They should say, "Now that dulness reigns, I must take greater pains in my selection and management than before, and thus, as far as can be, produce such quality as will induce a demand." The old adage is still true: there is room at the top although the bottom may be very much overcrowded, and the man who reaches the top round will always find not merely remunerative prices, but undoubted satisfaction as well in the prosecution of his calling.

In this country we may learn from the example given us by many of the breeders in Great Britain. It is in that country more than in any other that breeds have originated. How has this been done? Not by men who have merely had the motive of dollars and cents, but by men who have been imbued with the ambition to produce an animal of peculiar characteristics. Those who have been following sheep husbandry have had the ambition, if I may use the expression, to *make a sheep* with certain qualities of meat and wool. They have had a certain ideal before them, and year by year they have worked with the one object in view until finally they have accomplished their purpose. To some extent in Canada we have different surroundings; we may have to cater to a different market, but we ought to work somewhat on the same principles, and we may be sure that the man who thus accomplishes his purpose in completing the ideal that he has before him will always be the man who makes most money in his business.

Now, if you agree with me in the propositions I have thus laid down, the qustion will immediately be asked. What breed shall we obtain in order best to carry out this purpose? That question I cannot for several reasons answer; I must leave it to every man to answer for himself. If you desire to know my opinion, you must make enquiries as to what I do in my own practice, and that is the only answer I can give you as to my opinion of the particular breed which is best adapted for this purpose. It will be at best only an opinion, and although you may profit by my experience and by the experience of others who have for some time engaged in this business, I advise every young man in the land not to become a mere copyist in his calling; I advise him to study his own surroundings and his own circumstances and to act independently for himself. It is quite possible that what is best for me may not be best for you, and, therefore, I ought not, if I so desired, to lay down hard and fast rules for any other man to follow. Because I choose for the purpose I have suggested one particular breed of sheep, that is no reason why I should quarrel with my neighbor who chooses another. Only I desire to urge that we should all keep before us the one common object, that of producing in the highest perfection that which is demanded by our common market. But if you insist on merely copying what I do instead of using your own powers of observation and your own judgment, we can never have much advancement in matters of this kind in this country. On the other hand, if our breeders will use the opportunities afforded,—take advantage of the experience of those who are older and then think for themselves,—there ought to be some among us who will carry this matter forward to a much greater extent than we have ever gone before. Prejudices ought not to be allowed to prevent a proper decision in this matter. There are hundreds of our people who are adhering to one particular breed or another simply because they are prejudiced either for or against. In this enlightened age a man ought to be willing to throw aside any prejudices and look at the matter entirely from an independent and unbiased point of view.

There are two things especially which will be needed in order to produce the desired result by those who wish to carry on this industry in the future: first, good judgment, and second, good care and management; the latter of course will include good food for the animals. Now, these two things we hope to give those in attendance at our O.A.C. If we fail in this, we fail certainly in one of the essential reasons for the existence of this institution. The students who take the full course should always hold a decided advantage over those who have never enjoyed this privilege.

Because in our province we have different soils and to some extent a different climate, it becomes necessary in an institution such as our O.A.C. to provide for the purpose of education specimens of the different breeds of animals for the inspection and study of the students who may be in attendance. Thus by constant observation of the peculiar habits and special characteristics of each, everyone is able intelligently to decide as to the suitability of any given breed for his own locality.

It is clear that those who follow this industry in the future will be compelled of necessity to study the best methods that can be adopted to cheapen production. The object must not be to procure the heaviest animals but to produce on a given area the greatest number of pounds both of meat and wool at the least possible cost. If three sheep weighing 150 lb. each can be produced at less cost than two sheep weighing 200 lb. each, then it is clear that it will be to the advantage of the breeder to produce the smaller sheep. This is a matter which needs constant observation and investigation, and if some of our pet breeds must be lost sight of because of this fact being made clear as against them, let it be so.

We must remember that in the future even more than at present we shall be compelled to meet in an open market the results in this particular department of the best intelligence and skill in the whole world. My judgment, however, is that, with the advantages which our excellent climate affords, if our people will but pay attention to the points suggested as to quality and a lesser cost of production, we shall be able to hold our own against all comers.

There is no one who has studied these sheep statistics of our province but is clearly convinced that there is abundant room in Ontario for much greater development in this important branch of agriculture. Most of us deplore the fact that our population during the last forty years has increased at so small a ratio; yet a reference to statistics will show that the increase in the production of sheep falls far behind what might be expected from the actual increase in population. In 1851 in the Province of Ontario our population was 952,000. In 1891 it had increased to 2,114,475. The number of horses and cattle during that period, according to the last statistics of the Bureau of Industries, has multiplied by three. The number of swine has also increased in about the same ratio, but I find that the number of sheep has only increased by about half, the number being 1,050,168 in 1851, and 1,693,751 in 1891.

None of our domestic animals are more easily handled or produced with less labor and as little cost as sheep. Indeed a few sheep can be kept on every farm without the farmer being cognisant of much additional expense. This cannot be said of any of our other domestic animals. But notwithstanding this, the industry has not grown as we should like to have seen it.

It appears to me that, if we are to succeed in developing this industry in the future, two things are necessary. First, our farmers must have the opportunity to sell both mutton and wool in the best market that can be found. This subject is considered a political one and perhaps ought not to be mentioned in a paper of this sort; yet everyone must feel the force of the statement. So long as we are hampered in disposing of these products where we could do it to the best advantage, so long will our farmers find reason in that fact for refusing to increase their flocks. The second thing which seems to be necessary is more stringent laws for the protection of sheep against ravages by dogs.

The present law is certainly in advance of that which formerly existed, inasmuch as a man who allows his dog to run at large at night runs the risk of having him destroyed without legal recourse This results in most cases in the dogs being confined during the night. Still it is a lamentable fact that hundreds of sheep are even now annually destroyed in this way. In the township of Whitby, in Ontario county, I understand that during the past year a sum exceeding five hundred dollars has been paid out of the fund provided for the protection of sheep. An increase in the number of sheep means an increase of wealth, and sheep are I assume a necessity. Dogs add no wealth to the country, and at best must be considered as a luxury. In my judgment therefore, they ought not to be allowed to interfere with the development of this great industry.

Again, if sheep-husbandry in this country is to be developed as much as is desirable, the attention of those engaged in it must be turned towards the necessity of furnishing the market with a regular supply of the best mutton. It will not do at certain seasons of the year to depend for a supply only upon old and worn out animals. One crop of lambs ought to be handled by the producer in such a way that from these a supply can be afforded until another crop begins to be offered on the market. If this were done, those who wish the finest quality and who are quite willing to pay for it would always be able to secure it. The habit of rushing all the lambs on the market during one or two months of the year results in demoralisation in two ways; first, the prices at these seasons are almost sure to be brought down to such a low point that producers become discouraged and declare that the business does not afford a proper remuneration. Secondly, the supply of the best article is thus in a short time exhausted, being forced on the market when perhaps it is not all wanted, so that later on in the season it cannot be had, and the attention of the consumer is turned from this valuable meat product to some other which can more readily be supplied. As a remedy for this, attention should be drawn through the press and otherwise to the desirability and necessity for these animals being held for a greater length of time by such of the producers as can afford to do so. By this means a larger sum per head would be received. Already during this season, those who decided to hold their lambs are reaping an excellent profit by so doing. This will doubtless continue for some months. It may be that everyone engaged in the business cannot do this, but let those who can give attention to it, because they will be certain, if they have suitable buildings and plenty of feed, to reap a good reward by doing so. By the experiment carried on at the Experimental Farm last year, it will be seen that, should the American market be fully supplied, there is always a good market for a good article in Great Britain.

There can be no doubt that our Canadian climate gives us a decided advantage in the production of good mutton. The butchers' carts in New York and other large American cities bear abundant testimony to this by carrying in bold lettering through the streets the words "Canada mutton," which is taken to mean by those who read it that Canada mutton is superior to any other mutton consumed in those cities.

The intelligence, skill and industry of our people will supply all that is needed in addition to a good climate, and will we hope eventually put our Canada and especially our Province in the front rank in sheep production.

NOTES ON THE ORIGIN AND IMPROVEMENT OF CULTIVATED PLANTS.

Prepared by Prof. C. F. Wheeler of the Michigan Agricultural College.

All our knowledge of the origin of cultivated plants is scarcely half a century old. In 1807. Alex. Von Humboldt, the great German traveler and foremost scientific man of his time, wrote as follows: "The origin, the first home of the plants most useful to man, and which have accompanied him from the remotest epochs, is a secret as impentrable as the dwelling of all our domestic animals. We do not know what country produced spontaneously, wheat, barley, oats and rye. The plants which constitute the natural riches of all the inhabitants of the tropics, the banana, the pawpaw and maize, have never been found in a wild state." The latest work on this subject was published in 1882, by De Condolle, which was a complete revision of his sketch written in 1885, and is entitled, "The Origin of Cultivated Plants." This book contains a great deal of interesting information concering the history of our most common cultivated plants.

He writes in a different strain from that of Humboldt in 1807. He says "At the present day if a few cultivated species have not yet been seen in a wild state, this is not the case with the great majority. We know, at least most frequently, from what country they first came." Of the 247 species which De Condolle has studied and of which he has given us an account in this book, the Old World has furnished 199, and America 45, leaving three still uncertain. At this time I can only give brief notes of a few of the most important food plants which interest us as farmers to-day, and which now form the basis or our present agriculture and fruit growing. The origin of our principal field and graden plants is very old. The oldest known records both historic and prehistoric, show that wheat, barley and rice have been cultivated from the most primitive times. Ancient literature is full of allusions to wheat and barley. We read in the Bible—second book of Kings: "A measure of fine flour for a shekel, and two measures of barley for a shekel," plainly showing that the relative value of the two grains was settled in those early times.

List of Plants which have been Cultivated 4,000 Years.

America.—Maize, tobacco, potato, sweet potato.

Europe.—Apple, pear, almond, grape, flax, cabbage, turnip, rape.

Asia.—Wheat, rice, barley, fig, bean, olive, cucumber, quince, apricot, peach, hemp, mulberry, tea, onion.

Africa.—Castor oil, sorghum, date palm, watermelon.

LIST OF PLANTS WHICH HAVE BEEN CULTIVATED 2,000 YEARS.

AMERICA.—Pumpkin, squash, artichoke, red pepper, tomato, pine apple, peanuts.

EUROPE.—Beet, carrot, celery, lettuce, asparagus, leek, alfalfa, rye, oats, mustard.

ASIA.—Lemon, yam, garlic, indigo, cherry, bitter orange, plum, pea, nutmeg, black pepper, cotton, sugar cane.

LIST OF PLANTS WHICH HAVE BEEN CULTIVATED 1,000 YEARS.

AMERICA—Quinine.

EUROPE.—Parsnip, salsify, horseradish, parsley, chicory, hops, red clover, strawberry, red currant, black currant.

ASIA—Jute, bottle gourd, muskmelon, buckwheat, coffee, sweet orange.

AFRICA.—Okra.

The different species or kinds of plants which have been named by botanists up to this time number 110,000, belonging to 210 families, many of which are small, a few, however, are very large. The composite family exceeds all the others and contains over 10,000 species, or nearly 1-10th of the whole. This family might be called one of the royal families for two reasons. First, because it contains hosts of showy sorts which are only cultivated for their beauty, and secondly because it furnishes us only four useful food plants, viz: lettuce, salsify, celery, and the artichoke. To this family belong the asters, golden rods, sunflowers, dalias, dasies, dandelions, etc. To the rose family belong nearly all our fruits, apples, pears, peaches, cherries, blackberries, raspberries, strawberries. To the pulse family belong peas, beans, and clovers. To the potato family belong the tomato, peppers, egg plant, the potato. To the grass family belong all our cereal grains, wheat, barley, rye, oats, millet, rice and Indian corn, and our fodder grasses; these four families are entitled to be called the true royal families among cultivated plants. There is a vast disproportion between the total number of species of plants known to botanical science, and the number of these employed by man. Now if we should make a comprehensive list of all the flowering plants which are cultivated on what we may call a fairly large scale, to-day, placing therein all food and forage plants, all those which are grown for timber and cabinet woods, for fibres and cordage, for tanning materials, dyes, resins, rubber, gums, oils, perfumes, and medicines, we could bring together nearly 300 species. If we should add to this short catalogue all the wild species which may be used by man without cultivation, we should find it considerably lengthened. But after all, the total number of species of flowering plants utilised to any considerable extent by man in his civilized state does not exceed, in fact it does not quite reach 1 per cent. Such a ratio between the species known and the number used prompts the inquiry, can this short list of plants be increased to advantage? If so, how? This is an old question. In the dawn of civilisation, mankind inherited from savage ancestors some food plants which by simple cultivation helped to eke out in times of scarcity the spoils of fishing and hunting. The question which we ask to day was asked then. Primitive agriculturists examined wild plants for new uses. Age after age has added slowly and continuously to the list of cultivated and useful plants, but the aggregate additions have been comparatively slight. The question has thus no charm of novelty, but it is as practical to-day as in the early ages At the present time, in view of the great improvements of scientific research, this inquiry seems of great importance. The present professor of botany at Harvard University, Dr. Geo. L. Goodale, the worthy successor of the late Dr. Asa Gray, has just returned from a voyage around the world. During his long trip he paid especial attention to the economic side of botany, and had his eyes open for any new food plants or any improvement in old ones, in the various countries which he visited. Upon his return, in a speech made at Washington, he asks the following questions:

"What present likelihood is there that our tables may one of these days have other vegetables, fruits and cereals than those which we use now?"

"What chance is there that new fibers may supplement or replace those which we spin and weave, that woven fabrics may take on new vegetable colors, that flowers and leaves may yield new perfumes and flavors?"

"What possibility is there that new remedial agents may be found among plants neglected or now wholly unknown? In the past, useful plants have been selected by chance, but selection by accident is no selection at all."

At this point we may ask how have plants been improved? We answer, in two ways, First, by the operation of nature's methods through long ages before the advent of man. and secondly, by the direct action of man since his appearance on the globe

No true answer to the first question was possible fifty years ago. During the latter part of the first half of this century was discovered the method of fertilisation in plants. Long before, it had been known that unless pollen was placed in some way upon the stigmas of flowers, no fruit would set. The early missionaries who visited the Sandwich Islands soon learned that they could not raise squashes and melons in those islands. The vines grew well but set no fruit. The reason was that the male and female organs were borne in separate flowers, both, however, growing on the same plant, and as there were no bees to carry the pollen from one flower to the other they could not be fertilised. They soon learned to pollenise the flowers artificially, and afterwards the plants set and matured fruit abundantly.

Prof. L. H. Bailey in a recent lecture gives the philosophy of sex in these words: "In the lowest plants the species multiply by simple division or by a budding process. One individual of itself becomes two, and the two are therefore recasts of the one. But as organisms multiply and conditions become more complex, and as struggle increases, there comes a change in the parts of the individual, so that one cell or one cluster of cells, performed one labor, and other cells performed other labor; and this tendency resulted in the development of organs. Simple division therefore could no longer reproduce the whole complex individual, and as all organs are necessary to the existence of life the organism dies if it is divided. Along with this specialisation came the change into sex. and sex has clearly two offices: to hand over by some mysterious process the camplex organisation of the parent to the offspring, and also to unite the essential characters or tendencies of two beings into one. The second office is manifestly the greater; for as it unites two organisations into one it insures that the offspring is somewhat unlike either parent, and is therefore better fitted to seize upon any place or condition new to its kind, and as generations increase, the tendency to variation in the offspring must be constantly greater, because the impressions of a greater number of ancestors are transmitted to it.

"If, therefore, the philosophy of sex is to promote variation by the union of different individuals, it must follow that the greatest variation must come from parents considerably unlike each other in their minor characters. Thus it comes that self-fertilisation tends to weaken a type, and cross-fertilisation tends to strengthen it."

The fact of the variation of some plants under different conditions of climate, cultivation, etc., is well known. Perhaps there is not a plant which has changed more than Indian corn. Originally from South America, it is now cultivated from Patagonia to Canada, covering an extent north and south of over 7,000 miles. The many varieties which have been produced under these very different conditions show great variation not only in the texture of the grain but the leaf, stalk and ear are all marked by certain peculiarities. In one instance an eight rowed flint corn grown in Ohio, became much dented after seven years' cultivation, and the number of rows had increased from eight to twenty. Dr. Beal tells me that corn sent to Kansas as King Philip came back after three years well dented, while dent corn after a few years' cultivation in Germany was not only reduced in size but lost its dented characters. To this "tendency to vary" in plants we no doubt owe all the wonderful and beautiful forms of flowers and fruits which delight the eye and tempt the palate of man. Upon this fact of variation must we depend in our work of improving cultivated plants. We have found that it is not desirable that any flower should be fertilised by its own pollen. This most important discovery we owe to Darwin, who stated the fact in these words, "Nature abhors perpetual self-fertilisation." In studying the flowers of wild and cultivated plants we find the most various and curious contrivances to avoid self fertilisation The stamens (the male part of the flower) ripen the pollen before the pistils are ripe, and vice versa, by this means nature has in one way avoided the weakening process of close fertilisation. There are other ways of avoiding this condition. In some plants the male organs and the female organs are produced in separate flowers growing on the same plant, as is the case in squashes, melons and corn. In still another way flowers of different sexes grow on different plants. The willows are a familiar example of this condition. By these means the multitudes of plants in field, forest and garden, both wild and cultivated, have been kept from running out. In nature cross-fertilisation is secured by means of insects and the wind. As a rule all showy flowers are fertilised by insects.

The beauty of flowers is a sign hung out by nature to say to all passing bees, butterflies and insects generally, here are free dinners, nectar and pollen for all, all we ask in return is that you carry some pollen to the next flowers you visit. The curious springs and traps that some flowers set so that the bees shall be sure to get well dusted with pollen are marvellous beyond human comprehension.

Possibly you may feel at this point like asking, how do you know that there is any advantage to be gained by the plant in getting fertilised by foreign pollen? We know this as the result of a large number of very careful experiments which have been repeated by hundreds of observers. This is an age of experiments, some good, some bad. Experiment stations have now been established in all the States of the Union, and much good will eventually come from their combined work. Experiments which are conducted in a haphazard way are of no value, but one of the most valuable things in the world is an honest experiment carried out to the end, for no matter whether it results in success or failure, there is something valuable to be learned thereby.

I will cite the result of one experiment to prove that plants are benefited by being pollenised with other pollen than their own.

(1) The produce of a flower fertilised with its own pollen was sixty seeds.

(2) The produce of a flower on the same plant fertilised with pollen from another flower from this same plant was one hundred seeds.

(3) The produce of a flower of this same plant fertilised with pollen from a different plant of the same species, was 300 seeds.

This experiment clearly shows the advantage to the plant of fertilisation with foreign pollen.

Those plants which do not produce showy flowers do not secrete honey to attract insects and therefore depend on the wind to carry pollen from flower to flower; in such cases a great abundance of pollen is produced, as in corn, pines, oaks and alders, so that there may be no chance of failure. Cross-fertilisation between plants of the same species and varieties of the same species is then nature's way of keeping up the vitality and improving the character of wild plants.

In a few instances nature has been able to go farther, as when pollen from one species has accidentally or by design fallen upon the flower of a distinct but related species a hybrid has been produced. We hear a great deal about hybrids and hybridizing nowadays, and the great benefits to be derived therefrom as a means of improving our cultivated plants. Newspapers and fruit catalogues have much to say about this wonderful hybrid and that one, but as common every day folks what shall we think and believe about this matter? Prof. Bailey says in a recent article on this subject: "There is everywhere a misconception of what a hybrid is and how it comes to exist; and yet because of this indefinite knowledge there is a widespread feeling that a hybrid is necessarily good while while the presumption is directly opposite. The identity of a hybrid in the popular mind rests entirely upon some superficial character, and proceeds on the assumption that it is necessarily intermediate between the parents. Hence we find one of our popular authors asserting that because the Kohl Rabi bears its thickened portion midway of its stem, it is evidently a hybrid between a cabbage and turnip; and there are those who confound hybrid with high-bred and who build attractive castles upon the unconscious error, and thus is confusion confounded. The difficulties in the way of successful results through hybridising are, the difficulty of affecting the cross, instability, variability, and often weakness and monstrosity of the hybrids, and the absolute impossibility of predicting results." Dr. John Lindly of England, wrote over fifty years ago, "Hybridising is a game of chance played between men and plants."

Thos. Mehan of Philadelphia read a paper before the American Nurserymen's Association, held at Detroit in 1888, on the subject of hybridisation as a means of improving our fruits. He says, "It is next to impossible to make any good use of hybridising in improving plants. In the origination of new races it is however valuable. The introduction of new species for hybridisation or the importation of new varieties from abroad all have their uses as giving us new lines for starting on, but selection must be the chief weapon in our war against rough nature.

Let us examine the matter and learn how many hybrids have actually been produced that remain with us and to-day form profitable sorts for cultivation. Among grapes are the Roger's Hybrids, Lindley, Agawam, Wilder, Salem and Barry. In pears there is the Keiffer class. In apples, peaches, plums, cherries, gooesberries, blackberries, and dewberries there are no commercial hybrids. Some raspberries—like the Caroline and Shaffer—appear to be hybrids. Hybrids have been produced between the blackberry and the raspberry, but they possess no economic results.

Among all the list of garden vegetables (which are propagated from seed) I do not know of a single authentic hybrid; and the same is true of oats, grasses, and other farm crops, and also of wheat, unless it be the Carman wheat and rye varieties, lately become prominent. But among ornamental plants there are many hybrids, and it is a significant fact that the most numerous, the most marked and the most successful hybrids occur in plants most carefully cultivated and protected. This is nowhere so well illustrated as in the case of cultivated orchids, in which also every individual plant is nursed and coddled.

We now reach the conclusion that hybridising, although in a few cases successful, cannot be our main reliance in the improvement of cultivated plants. We have already shown that cross-fertilisation between species and varietes has resulted in greatly increased vigor of plant and productiveness of seeds.

The second method of improvement of plants, viz: selection remains to be discussed. Let us notice some of the results of selection by the action of man in improving our fruits. Dr. Van Mons, of Belgium, was one of the early workers in this line. He chose the pear to operate upon. He began by sewing a large number of the seeds of the wild pear. He waited patiently till these fruited. From the earliest and best fruits of the first sowing he again planted the seeds and waited again, repeating the operation till in his old age he saw the eighth generation of his pear seedlings bearing fruit. Selecting some of the best of his seedlings, at the end he had a number of very fine varieties of pears, which to this day continue to be standard both in Europe and in this country. He advised his friends to sow, to sow again, to resow, and to sow perpetually. He declared that the many fine varieties of pears of which he was the originator were produced by this system of improvement.

Let us notice the labors of an American in this line. Prof. J. P Kirtland, of Cleveland, Ohio, devoted a long life to the improvement of fruits by means of cross-breeding and selection. His main work was in the improvement of our cherries.

He began in 1812, when a young man, to experiment with cherries, and the results of his work were so marked that in 1875 the State Horticultural Society, of Ohio, passed a series of resolutions as a slight testimonial of its appreciation of the great value of his labors. At this time Dr. Kirtland was eighty years of age. I will quote from his letter thanking the Horticultural Society for the resolutions. He says: "Will you officially present to the Society my grateful acknowledgements for the favorable expression in regard to the results of my efforts at producing new varieties of the cherry. Assure them that my aspiration in this pursuit has been to awaken and develop an ambition among the young horticulturists, male and female, to advance their calling either as a trade or an amusement. An immense and almost unoccupied field lies before them to produce varieties of fruits by means of crossing and selection. There is no limit to it in the vegetable kingdom, and there is no predicting what its results will be." Among many seedling cherries which were produced by Dr. Kirtland, over thirty are considered of fine quality. Perhaps the well-known "Gov. Wood" is the best.

Let us now examine the methods of selection which thus far have yielded the best results in the improvement of our grain and field crops. I shall attempt to show that selection and good cultivation have been the two means of the greatest importance in the hands of experimenters, and to this end I will give the results of one of the most successful raisers of pedigree seeds in the world. I refer to Major Hallett, of England. He began in 1857 to search for the best heads of wheat in his fields. The best head he found for his purpose measured four and three-eighths inches in length and contained forty-seven grains. From the produce of these grains in 1858, the best head was again selected; it measured six and one-fourth inches, and contained forty-nine grains, ten stalks in the stool. This was again sowed, and in 1859 the longest head measured seven and three-fourths inches, and contained ninety-one grains, twenty-two stalks in the stool. In 1871 the following results were reached: The finest head measured eight and three-fourths inches, and contained 123 grains with fifty-two stalks to the stool. "Thus," writes Mr. Hallet, "by means of repeated selection and cultivation, in this short time the length of the heads have been doubled, their contents nearly trebled, and the tillering power of the seed increased five-fold."

Mr. Hallett's method of sowing the grains was as follows: The seeds were planted one in each place, 9x9 inches apart, and well cultivated. The results of sowing this pedigree seed on a large scale are very remarkable. In a field of ten acres, even in an unfavorable year, the yield was fifty-seven bushels to the acre, while with ordinary seed on previous years the same land yielded only thirty-two to forty bushels to the acre.

Wheat improved by Hallett's system has now been cultivated in more than forty different coutries in Europe, Asia, Africa America, and Australia, with complete success everywhere, so far as reports have been received. A parcel of pedigree wheat taken to Perth, Western Australia, in 1862, where the average crop was ten bushels to the acre, produced from 29 to 35 bushels to the acre. In 1881 the same wheat, or its descendants, produced in New Zealand seventy-two bushels on one acre. The same return of seventy-two bushels to the acre was reported of three acres in Essex, England, in 1876. The same success has been obtained from oats and barley cultivated after this system.

A friend of Major Hallett applied this system to the sugar-beet in Italy with the result of obtaining, after seven years of improvement, three times as much sugar and wine from the same acerage of root as he had been accustomed to get at first.

A word in conclusion: If a small part of the time and money which is being spent in breeding trotters and fancy stock generally could be diverted to the breeding of pedigree seeds, our farmers would sooner realise the good time that is surely in store for them.

RESOLUTIONS.

The following resolution was moved by W. F. Clark, and seconded by John Dickinson:

Resolved, that in the opinion of this Union, sheep-killing dogs are the great hindrance to the development of the sheep industry in this Province, and consequently one of the causes of agricultural depression.

After discussion the resolution was carried.

It was moved by A. E. McKenzie, and seconded by N. Monteith, that the following resolution be adopted:

Resolved, that we recommend that the Agricultural and Experimental Union undertake experimental work in the matter of dehorning cattle, and that we ask the Ontario Experimental Farm authorities to experiment in this line also.

This motion was adopted after considerable discussion.

The proceedings were brought to a close about 5 p.m., Friday, after a few remarks from several present, who spoke in high appreciation of the work of the Union.

APPENDIX I.

GRADUATES AND ASSOCIATES.

1. Bachelors of the Science of Agriculture, Degree of B.S.A.

University of Toronto.

1890—Brodie, G. A.
1891—Buchanan, D.

1891—Cowan, J. H.
1888—Craig, J. A.
1888—Creelman, G. C.

1890—Dean, H. H.

1888—Fee, J. J.
1891—Field, H.
1889—Harcourt, G.
1891—Hewgill, E. A., (*ob.*)
1891—Hutt, H. L.
1889—Hutton, J. R.

1889—Lehmann, A.
1891—Linfield, F. B.

1890—McCallum, W.
1890—Monteith, S. N.
1889—Morgan, J. H. A.
1891—Palmer, W. J.

1888—Paterson, B. E.
1889—Raynor, T.

1890—Shantz, A.
1891—Sharman, H. B.
1891—Sleightholm, J. A. B.
1889—Soule, R. M. (*ob.*)

1891—Whitley, C. F.
1888—Zavitz, C. A.

2. Associates.

The total number of Associates up to the present time is 214, as follows :

1888—Austin, A. M.
1880—Anderson, J.
1880—Ash, W. E.

1881—Ballantyne, W. W.
1879—Bannard, E. L.
1888—Bayne, S. R. S.
1888—Birdsall, W. G.
1888—Bishop, W. R.
1889—*Brodie, G. A.
1890—Brown, H. H.
1890—Buchanan, D.
1888—Budd, W.
1885—‡Butler, G. C.
1884—Black, P. C.
1882—Blanchard, E. L.
1886—Broome, A. H.
1886—‡Brown, C. R.
1888—Brown, S. P.

1886—Calvert, S.
1890—Campbell, C. S.
1877—Campbell, J. A.
1880—Campbell, D. P. L.
1891—Carlyle, W. L.
1884—*Carpenter, P. A., (*ob.*)
1888—Carpenter, W. S.
1886—Cobb, O.
1880—Chapman, R. K.
1882—Charlton, G. H.
1882—Chase, O.
1879—Clark, J.
1879—Clinton, N. J.
1880—Clutton, A. H.
1890—Cowan, J. H.
1890—‡Cowan, R. E.
1887—Craig, J. A.
1887—Creelman, G. C.
1878—Crompton, E.

1878—Davis, C. J.
1880—Dawes, M. A.
1882—Dawson, J. J.
1888—†Dean, H. H.
1882—Dennis, J.
1889—Derbyshire, J. A.
1881—Dickenson, C. S.
1890—Dolsen, W. J.
1887—Donald, G. C.
1887—Donaldson, F. N.
1877—Douglas, J. D.
1877—Dunlop, S.

1890—Elliott, R.
1888—Elton, C. W.
1888—Elton, R. F.
1882—Elworthy, R. H.
1887—Ewing, W.
1878—Farlinger, W. K.
1886—Fee, J. J.
1890—Field, H.
1881—File, J.
1882—Fotheringham, J.
1883—‡Fotheringham, W.
1879—Fyfe, A.

1883—Garland, C. S.
1889—Gelling, J. A.
1891—*Gibson, D. Z.
1887—Gilbert, W. J., (*ob.*)
1879—Gillespie, G. H.
1878—Graham, D.
1879—Greig, G. H.
1881—Grindley, A. W.

1890—Hadwen, G. H.
1891—Haight, W. L.
1882—Hallesy, F.
1888—*Harcourt, G.
1890—†Harcourt, J.
1887—Harkness, A. D.
1891—Harrison, F. C.
1888—Harrison R. E.
1887—Hart, J. A.

---

* Gold Medalist. † First Silver Medalist. ‡ Second Silver Medalist.

ASSOCIATES.—*Continued.*

1887—Hart, J. W.
1888—Heacock, F. W.
1890—Hewgill, E. A., *(ob.)*
1890—Holliday, W. B.
1886—Holtby, R. M.
1880—Holtermann, R. F.
1882—Horne, W. H.
1888—Horrocks, T. J.
1887—Howes, J. S.
1882—Howitt, W.
1890—*Hutt, H. L.
1888—Hutton, J. R.

1886—Idington, P. S.

1886—Jeffrey, J. S.
1883—Jeffs, H. B.
1879—Jopling, W.

1888—Knowlton, S. M.

1882—Landsborough, J.
1887—Leavens, D. H.
1884—‡Lehmann, A.
1887—‡Lick, E.
1877—Lindsay, A. J.
1889—‡Linfield, F. B.
1887—Livesey, E. M.
1880—Lomas J. W.
1878—Logan, T.

1880—Macaulay, H.
1890—Macfarlane, T. W. R.
1885—Macpherson, A.
1886—*Madge, R. W.
1882—Mahoney, E. C.
1884—Major, C. H.
1889—Marsack, F.
1889—Marsack, H. A.
1891—Marsh, G. F.
1877—Mason, T. H.
1890—McKergow, J. G.
1877—Meyer, G. W.
1887—Morgan, J. H. A.
1881—Motherwell, W. R.
1885—†Muir, J. B.
1887—McCallum, E. G.
1889—McCallum, W.
1889—McEvoy, T. A.
1885—McIntyre, D. N.
1885—McKay, J. B.
1886—McKay, J. G.
1891—McKenzie, A. G.
1889—McLaren, P. S.
1883—McPherson, D.
1890—Monk, W. D.
1889—Monteith, S. N.
1891—*Morgan, R. N.
1890—Mulholland, F.

1878—Naismith, D. M.
1891—Newcomen, W. F.
1879—Nicol, A., *(ob.)*
1882—Nicol, G.
1882—Notman, C. R.

1877—O'Beirne, A. O.
1887—Orsman, C. P.
1886—Owen, W. H.

1888—Palmer, W J.
1887—Paterson, B. E.
1883—Perry, D. E.
1891—Perry, E. C.
1881—§Phin, R. J.
1881—Phin, W. E.
1881—Pope, H.
1886—Power, R. M.
1884—Powys, P. O.

1882—‡Ramsay, R. A.
1879—Randall, J. R.
1885—*Raynor, T.
1885—Reid, P.
1889—Rendall, W.
1889—Rennie, E. A.
1883—*Robertson, W.
1879—Robertson, J.
1881—Robins, W. P.
1879—Robinson, C. B.
1881—Ross, J. G.

1884—Saxton, E. A.
1888—Serson, W. E.
1868—Sinclair, J. J.
1882—Silverthorne, N.
1888—Soule, R. M., *(ob.)*
1877—Sykes, W. J.
1883—Schwartz, J. A.
1887—†Scrugham, J. G.
1888—Shantz, A.
1887—Sharman, H. B.
1877—Shaw, G. H.
1882—†Shuttleworth, A. E.
1884—†Slater, H., *(ob.)*
1887—*Sleightholm, F. J.
1890—Sleightholm, J. A. B.
1885—Smith, E. P.
1891—Sparrow, J. C. H.
1891—Spencer, W. A.
1884—Steers, O.
1888—Stevenson, C. R.
1878—Stewart, W.
1882—Stover, W. J.
1886—†Sturge, E.
1888—Sweet, H. R.

1891—Thompson, R. A.
1889—‡Tinney, T. H.
1879—Toole, L.
1883—Torrance, W. J.
1884—Tucker, H. V.
1885—Thompson, W. D.

1888—Valance, R., *(ob.)*

1879—Warnica, A. W.
1884—Wark, A. E.
1878—Warren, J. B.
1890—Webster, F. E.
1880—§Webster, J. L.
1879—Wells, C.
1890—Wells, E.
1882—Wettlaufer, F.
1891—White, E. F.
1891—†Wilkin, F. A.
1879—Wilkinson, J. P.
1888—Willans, T. B.
1888—Willans, N.
1879—Willis, J.
1883—Willis, W. B., *(ob.)*
1888—Wilmot, A. B.
1890—Wilson, F. G.
1882—White, C. D.
1879—White, G. P.
1890—Whitley, C. F.
1890—Wood, W. D.
1884—Wroughton, T. A.

1886—Zavitz, C. A.

---

* Gold Medalist. † First Silver Medalist. ‡ Second Silver Medalist.
§ Winner of the Governor-General's Medal—the only medal given that year.

APPENDIX II.

COLLEGE ROLL FOR 1891.

Third Year Students.

Name.	P. O. Address.	County, etc.
*Buchanan, D.	Hensall	Huron, Ont.
†Carlyle, W. L.	Chesterville	Dundas, Ont.
*Cowan, J. H.	Galt	Waterloo, Ont.
*Field, H.	Cobourg	Northumberland, Ont.
†Gibson, D. Z.	Willow Grove	Haldimand, Ont.
†Haight, W. L.	Wellington	Prince Edward, Ont.
†Harrison, F. C.	Ronda	Spain.
*Hewgill, E. A	Heathcote	Grey, Ont.
Holliday, W. B.	North Shields	England.
Hutchinson, J. W	Randolph	Wisconsin, U. S. A.
*Hutt, H. L.	South End	Welland, Ont.
*Linfield, F. B.	Dunlop	Huron, Ont.
†Marsh, G F	Thornbury	Grey, Ont.
Morgan, R. N	Kerwood	Middlesex, Ont.
†Newcomen, W. F.	Epping, Essex	England.
*Palmer, W. J	Charlottetown	Prince Edward Island.
*Sleightholm, J. A. B.	Brampton	Peel, Ont.
*Sharman, H. B	Stratford	Perth, Ont.
†Sparrow, J. C. H.	Antrim	Carleton, Ont.
*Whitley, C. F.	Enfield	Middlesex, England.

Second Year Students.

Name.	P. O. Address.	County, etc.
Aylesworth, D.	Bath	Lennox, Ont.
Beckett, H. L.	Hamilton	Wentworth, Ont.
Bell, L. G.	Qu'Appelle	North-west Territory.
Brown, B. C.	Kingston	Frontenac, Ont.
Burns, J. A. S.	Halifax	Nova Scotia.
Carlaw, W.	Warkworth	Northumberland, Ont.
Carpenter, F. C. S.	Rat Portage	Rainy River District.
Crealy, J. E.	Strathroy	Middlesex, Ont.
Dyer, W. D.	Columbus	Ontario, Ont.
Eaton, L. W.	Dartmouth	Nova Scotia.
Freeman, G. M.	Boxgrove	York, Ont.
Gies, N.	St. Jacobs	Waterloo, Ont.
Graham, W. R.	Belleville	Hastings, Ont.
Harcourt, R	St. Anns	Lincoln, Ont.
Harvey, W. H	Exeter	Huron, Ont.
Honsberger, J. D.	Jordan Station	Lincoln, Ont.
Hunter, G. N	St. George	Brant, Ont.
Hurley, F. J	Belleville	Hastings, Ont.
Kent, A. L.	Toronto	York, Ont.
Moody, A. A.	Guelph	Wellington, Ont.
Milne, H. S.	Brown's Corners	York, Ont.
Murphy, A.	Sidney	Cape Breton, N. S.
†McKenzie, A. G.	Fairview	Oxford, Ont.
†Perry, E.	Smithville	Lincoln, Ont.
Roper-Curzon A.	Kingston	England.
Roper-Curzon S.	Kingston	England.
Ruthven, W. A.	West Essa	Simcoe, Ont.
Shaw, R. S.	Guelph	Wellington, Ont.
Silverthorn, C.	Summerville	York, Ont.
Soule, A. McNairn	Southend	Welland, Ont.
†Spencer, W. A.	Salmon Point	Prince Edward, Ont.
Story, H.	Picton	Prince Edward, Ont.
†Thompson, R. A.	Thornton	Simcoe, Ont.
Tolton, J. E.	Walkerton	Bruce, Ont.
†White, E. F.	Clarksburg	Grey, Ont.
Whiteworth, E. J	Fenwick	Welland, Ont.
Wiancko, A. T.	Sparrow Lake	Muskoka, Ont.
†Wilkin, F. A.	Calgary	North-west Territory.
Yuill, A. R	Carleton Place	Lanark, Ont.

---

* Obtained the degree of B. S. A. in June. † Received an Associate Diploma in June.

College Roll for 1891.—*Continued.*

First Year Students.

Name.	P. O. Address.	County, etc.
Adams, H. E	Greenwich	England.
Adams, M. P.	Greenwich	England.
Arnton, C. S	Montreal	Quebec.
Atkinson, J	Seaforth	Huron, Ont.
Aveline, R.	Somerset	England.
Baird, W. H	Weir	Wentworth, Ont.
Barr, D. M	Douglas	Renfrew, Ont.
Bealey, H. B	Ratcliffe Close	England.
Black, H	Scotch Block	Halton, Ont.
Brooks, W. C	Brantford	Brant, Ont.
Brown, W. J	Dunboyne	Elgin, Ont.
Bryson, F	Montreal	Quebec.
Burns, J. H	Kirkton	Perth, Ont.
Burdett, A. H	Hallatrow Court	N. Bristol, England.
Conn, J	Heathcote	Grey, Ont.
Connor, G	Chiselhurst	Huron, Ont.
Copeland, B. M	Hamilton	Wentworth, Ont.
Cooper, W. W	Kippen	Huron, Ont.
Counsell, N. W	Hamilton	Wentworth, Ont.
Cowen, J. T	Hereward	Dufferin, Ont.
Day, G. E	Guelph	Wellington, Ont.
Dean, F	Harley	Brant, Ont.
Doherty, G. F	Kingston	Kent Co., N. B.
Elford, F. C	Holmesville	Huron, Ont.
Elmes, W. A	Princeton	Brant, Ont.
Emigh, C. G	Holbrook	Oxford, Ont.
Farrer, J. W	Parry Sound	Parry Sound. Ont.
Ferguson, J. J	Smith's Falls	Leeds, Ont.
Ferraby, E. L	Cottingham	Yorkshire, Eng.
Findlav, J. H	Barrie.	Simcoe, Ont.
Grey, F. W	Delhi	India.
Hamilton, C. A. W	Alcester	Warwickshire, Eng.
Harvey, T. B	Charing Cross	Kent, Ont.
Hay, L	Ruda Guzowska	Poland.
Heward, A. D	Toronto	York, Ont.
Holmes, C. W	Selkirk	Haldimand, Ont.
Huoter, H. A	Orangeville	Dufferin, Ont.
Huoter, G. N	St. George	Brant, Ont.
Husband, E. M	Cairngorm.	Middlesex, Ont.
Jackson, T. M	Victoria	British Columbia.
Kennedy, P. B	Sarnia	Lambton, Ont.
Kerr, W. C	Pembroke	Renfrew, Ont.
King, W. A	Decewsville	Haldimand, Ont.
Kirk, H	Kirkton	Huron, Ont.
Lehmann, R. A	Orillia	Simcoe, Ont.
Lowden, S. C.	Toronto	York, Ont.
Maclean, R. R	Stanley House	Muskoka, Ont.
Macfarlane, A. C	Ottawa	Carleton, Ont.
McCallum, W	Guelph	Wellington, Ont.
McCrimmon, W. D	Glen Roy	Glengarry, Ont.
McKenzie, W. G	West Zorra	Oxford, Ont.
McKenzie, G	Columbus	Ontario, Ont.
McNaughton, K	Walkerton	Bruce, Ont.
McLean, T. S	Innerkip	Oxford, Ont.
Miller, C. W	Longford Mills	Ontario, Ont.
Milson, W. G	Goring	Grey, Ont.
Nunn, H.	Bolton	Peel, Ont.
Phin, Geo	Hespeler	Waterloo, Ont.
Phin, A. E	Hespeler	Waterloo, Ont.
Price, L. G	Croydon, Surrey	England.
Robertson, Wm.	Meaford	Grey, Ont.
Sloan, Wm. A	Iona	Elgin, Ont.
Spencer, J. B	Brooklin	Ontario, Ont.
Stewart, J	Snake River	Renfrew, Ont.
Stewart, C	Glasgow	Scotland.
Thomas, B. C	Toronto	York, Ont.
Tucker, R	Bosworth	Wellington, Ont.
Vanatter, A. B	Ballinafad	Wellington, Ont.
Vanatter, P. O	Ballinafad	Wellington, Ont.
Wait, J. W	St. George	Brant, Ont.
Walker, F	Norwich	Oxford, Ont.
Webster, C. L	Lutherville	Leeds, Ont.
Widdifield, J. W	Siloam	Ontario, Ont.

APPENDIX III.

SYLLABUS OF LECTURES.

Lectures began as usual on the 1st October, 1890, and continued until the 28th June, 1891, which latter date was the end of the scholastic year 1890–91.

The following syllabus of lectures will convey some idea of the class-room work done by the several Professors in the nine months just mentioned :

FIRST YEAR.

Fall Term.—1st October to 22nd December.

DEPARTMENT 1.—AGRICULTURE.

Introductory.—Ancient and modern agriculture ; agricultural literature ; different systems of farming ; history of agriculture.

Soils.—Their formation and composition, physical and chemical properties, etc.; examination and classification of soils ; cultivation of soils, including various tillage operations—plowing, harrowing, cultivating, rolling, etc.

Land Drainage.—Method of laying out drains ; various kinds of drains and their construction ; different modes of draining.

Rotation of Crops.—Importance and necessity of rotation ; principles underlying it ; rotations suitable to different kinds of soil ; examination and criticism of different systems of rotation.

Cattle.—Pointing out and naming the different parts of the animal ; characteristic points and peculiarities of the principal beef and dairy breeds of cattle ; practical handling of beef and dairy animals.

DEPARTMENT 2.—NATURAL SCIENCE.

Chemical Physics.—Matter ; accessory and essential properties of matter ; attraction ; various kinds of attraction—cohesion, adhesion, capillary, electrical and chemical ; specific gravity ; weights and measures ; heat, measurement of heat, thermometers, specific and latent heat ; sources, natures and laws of light.

Inorganic Chemistry.—Scope of subject ; elementary and compound substances ; chemical affinity ; symbols ; nomenclature ; combining proportions by weight and by volume ; atomic theory ; atomicity and basicity ; oxygen and hydrogen ; water—its nature, functions, decomposition and impurities ; nitrogen ; the atmosphere—its composition, uses and impurities ; ammonia—its sources and uses ; nitric acid and its connection with plants.

Human Physiology and Hygiene.—Description of the different tissues of the body ; alimentary system ; circulatory system ; nervous system ; importance of ventilation and the influence of food on the body ; remarks on the proper care of the body and attention to its surroundings in order to keep it in a continual state of health.

Zoology.—Distinction between animate and inanimate objects ; distinction between plants and animals ; basis of classification of animals ; leading character of each subkingdom, with special reference to classes of animals connected with agriculture.

DEPARTMENT 3.—VETERINARY SCIENCE.

Anatomy and Physiology of the horse, ox, sheep and pig ; osseous system, muscular system, syndesmology, plantar system and odontology.

DEPARTMENT 4.—ENGLISH.

Composition.—Review of grammar, with exercises on capital letters and punctuation.

Literature.—Selections from Byron and Addison.

DEPARTMENT 5.—MATHEMATICS.

Arithmetic.—Review of subject, with special reference to farm accounts. Interest, discount, stocks and partnership.

Mental Arithmetic.—Calculations in simple rules.

Book-keeping.—Subject commenced.

Winter Term.—22nd January to 16th April.

DEPARTMENT 1.—AGRICULTURE.

Manures—Composition, management and application of farm-yard manure; artificial fertilisers—their composition, uses and modes of application; mechanical and chemical effects of manures on various kinds of soil and crops; the amounts to apply, etc.; green manures.

Crops for Soiling.—The advantages of soiling; the principal soiling crops; feeding of green crops to live stock.

The Weeds of the Farm.—The most troublesome weeds described and different modes of eradicating them.

Sheep.—Characteristic points of medium and long wool breeds and practical handling of same.

DEPARTMENT 2.—NATURAL SCIENCE.

Inorganic Chemistry (*Continued*).—Carbon; combustion; carbonic acid and its relation to the animal and vegetable kingdom; sulphur and its compounds; manufacture and uses of sulphuric acid; phosphorus; phosphoric acid and its importance in agriculture; chlorine—its bleaching properties; bromine; iodine; silicon; potassium; calcium; magnesium; iron, etc.

Organic Chemistry.—Constitution of organic compounds, alcohols, aldehydes, acids and their derivatives; formic, acetic, oxalic, tartaric, citric, lactic, malic, uric, and tannic acids. Constitution of oils and fats—saponification; sugars, starch, cellulose; albuminoids, or flesh formers, and their allies; essential oils; alkaloids—morphine and quinine; classification of organic compounds.

Zoology (*Continued*).—Sub-kingdoms further described; detailed account of some injurious parasites, such as "liver-fluke," "tape-worm," "trichina," etc.; insects—their influence on plant life; corals and mollusks as agents in the formation of soil; vertebrates, with special reference to those of importance in the economy of the farm.

Lectures illustrated by specimens and diagrams.

DEPARTMENT 3.—VETERINARY SCIENCE.

Veterinary Anatomy.—Anatomy and physiology of the horse, ox, sheep, and pig—digestive system, circulatory system, respiratory system, urinary system, nervous system, sensitive system, generative system, tegumental system.

DEPARTMENT 4.—ENGLISH.

Composition.—Exercises continued; abstracts of speeches and essays; letter writing.

English Classics.—Critical study of selections from Byron and Addison.

DEPARTMENT 5.—MATHEMATICS AND BOOK-KEEPING.

Arithmetic.—Equation of payments; percentage; profit and loss; stocks; partnership; exchange.

Book-keeping.—Business forms and correspondence; general farm accounts; dairy, field and garden accounts.

Spring Term—17th April to 30th June.

DEPARTMENT 1.—AGRICULTURE.

Preparation of Soil.—Modes of preparation for different crops, and various kinds of soil.

Seeds and Sowing.—Testing the quality of seed; changing seed; quantity per acre; and methods of sowing.

The Crops of the Farm.—Their growth and management—hay, rye, wheat, barley, oats, peas, buckwheat, potatoes, turnips, mangels, sugar beets, rape, etc.

Pastures.—Growth and management of pastures; temporary and permanent pastures.

Feeding of Live Stock.—General outline of the principles of feeding different kinds of stock.

DEPARTMENT 2.—NATURAL SCIENCE.

Geology.—Connection between geology and agriculture; classification of rocks—their origin and mode of formation, changes which they have undergone after decomposition; fossils—their origin and importance; geological periods and characteristics of each.

Geology of Canada, with special reference to the nature and economic value of the rock deposits; glacial period and its influence on the formation of soil.

Lectures illustrated by numerous specimens and diagrams.

Botany.—Full description of seed, roots, stem, leaves, and flower. Plants brought into the lecture room and analysed before the class, so as to render students familiar with the different organs and their use in the plant economy.

Lectures illustrated by excellent diagrams.

DEPARTMENT 3.—VETERINARY SCIENCE.

Materia Medica.—The preparation, doses, action, and use of about one hundred of the principal medicines used in veterinary practice.

DEPARTMENT 4.—ENGLISH.

English Grammar and Composition.—Authorised Grammar and Williams' Practical English

English Classics.—Critical study of selections from Wordsworth.

DEPARTMENT 5.—MATHEMATICS.

Mensuration.—Mensuration of surfaces—the square, rectangle, triangle, trapezoid, regular polygon, circle. Special application to the measurement of lumber. Mensuration of solids; special application to the measurement of timber, earth, etc.

SECOND YEAR.

Fall Term—1st October to 22nd December.

DEPARTMENT 1.—AGRICULTURE.

Cattle.—Origin and history of the leading breeds of cattle in America; beef breeds—their leading characteristics and principal points; dairy breeds—their leading characteristics and principal points; practical handling and judging of cattle.

DEPARTMENT 2.—NATURAL SCIENCE.

Agricultural Chemistry.—Connection between chemistry and agriculture; the various compounds which enter into the composition of the bodies of animals; the chemical changes which food undergoes during digestion; chemical changes which occur during the decomposition of the bodies of animals at death; the functions of animals and plants contrasted; food of plants, and whence derived; origin and nature of soils; classification of soils; causes of unproductiveness in soil and how detected; preservation, improvement and renovation of soils; manures classified; the chemical action of manures on different soils; commercial valuation of fertilisers.

Horticulture.—Ontario as a fruit-growing country; the natural divisions into which it may be divided for growing fruit; detailed account of the operations, layering, grafting, budding, pruning, etc.; laying out and cultivation of an orchard; list of fruits best suited for general purposes, with best methods for their cultivation; remarks on gardening as a source of profit; plants best adapted to bedding and potting.

Lectures illustrated by practical work in the garden and specimens in the class room.

DEPARTMENT 3.—VETERINARY SCIENCE.

Pathology—Osseous System.—Nature, causes, symptoms and treatment of diseases of bone, as splint, spavin, ringbone, etc.

Muscular System.—Nature, causes and treatment of flesh-wounds, etc.

Sydesmology.—Nature, causes, symptoms, and treatment of curb, bog-spavin and other diseases of the joints.

Plantar System.—Nature, causes, symptoms, and treatment of corns, sand-crack, founder and other diseases of the feet.

Odontology.—Diseases of the teeth and treatment of the same.

DEPARTMENT 4.—ENGLISH.

English Classics.—Critical study of Shakespeare's "Julius Cæsar."

DEPARTMENT 5.—MATHEMATICS.

Dynamics.—Motion, forces producing motion, momentum; work, the simple machines, etc.

Drainage.—General principles; how to lay out a system of drains; how, where and when to commence draining; depth of drains and distances apart; grades and cost of draining.

Winter Term—22nd January to 16th April.

DEPARTMENT 1.—AGRICULTURE.

Sheep.—Origin and history of the leading breeds of sheep in Britain and America; coarse, medium and fine woolled sheep—their leading characteristics and principal points; practical handling and judging of sheep.

Swine.—Origin and history of the leading breeds of swine in Britain and America; large and small breeds of swine—their leading characteristics and principal points; practical handling and judging of swine.

DEPARTMENT 2.—NATURAL SCIENCE.

Agricultural Chemistry.—Continuation of the subject from preceding term, as follows: Composition of plants in relation to the soils upon which they grow; rotations of crops; the classification of fodders according to their chemical composition and a general treatment of the science of cattle feeding; relation of feeding to manure; chemistry of the dairy.

Entomology.—Importance of the subject to agriculturists; beneficial and injurious insects—their habits and the best means of checking the ravages of the latter.

Lectures illustrated by specimens.

Meteorology.—Relation of meteorology to agriculture; composition and movements of the atmosphere; description of the barometer; different kinds of thermometers; pluviameter and anemometer. and how to read them; temperature, its influence on agriculture; the elements which are to be considered in the discussion of climate; the principles considered in forecasting the weather.

Lectures illustrated by instruments referred to.

DEPARTMENT 3.—VETERINARY SCIENCE.

Digestive System.—Nature, causes, symptoms, and treatment of spasmodic and flatulent colic, inflammation of the bowels, acute indigestion, tympanitis in cattle, impaction of the rumen and many other common diseases.

Circulatory System.—Description of the diseases of the heart and blood.

Respiratory System.—Nature, causes, symptoms, and treatment of catarrh, nasalgleet, roaring, bronchitis, pleurisy and inflammation of the lungs, etc.

Urinary System.—Nature, causes, symptoms, and treatment of inflammation of the kidneys, etc.

Nervous System.—Nature, causes, symptoms and treatment of lock-jaw, spring halt, etc,

Sensitive System.—Nature, causes, symptoms and treatment of the diseases of the eye and ear.

Generative System.—Nature, causes, symptoms and treatment of abortion, milk fever, etc.

Tegumental System.—Nature, causes, symptoms and treatment of scratches, sallenders, mallenders, parasites and other diseases of the skin.

DEPARTMENT 4.—ENGLISH LITERATURE AND POLITICAL ECONOMY.

English Classics.—The critical study of Shakespeare's " Othello."

Political Economy.—Utility; production of wealth—land, labor, capital; division of labor; distribution of wealth; wages; trades unions; co-operation; money; credit; credit cycles; functions of government; taxation, etc.

DEPARTMENT 5.—MATHEMATICS.

Statics.—Theory of equilibrium; composition and resolution of forces; parallelogram of forces; moments; centre of gravity, etc.

Hydrostatics.—Transmission of pressure; the hydraulic press: specific gravity; density; pumps, siphons, etc.

Book-keeping.—Review of previous work.

Spring Term.—17th April to 30th June.

DEPARTMENT 1.—AGRICULTURE.

Breeding.—Outline of the general principles of breeding.

Feeding.—Feeding standards; feeding for growth, meat, milk, quality of milk, etc.

Care and management of cattle, sheep and swine; care at different periods of growth, at different seasons and under varying conditions.

DEPARTMENT 2.—NATURAL SCIENCE.

Determination of soils and fertilisers by physical properties.

Analytical Chemistry.—Chemical manipulation, preparation of common gases and reagents; operations and analysis—solution, filtration, precipitation, evaporation, distillatian, sublimation, ignition and the use of the blow-pipe ; testing of substances by reagents ; impurities in water ; adulterations in foods and artificial manures ; injurious substances in soils.

Systematic and Economic Botany.—Classification of plants and characters of the most important orders.

This course is illustrated by a large collection of plants in the college herbarium and also by analysis of several plants collected in the fields and woods of the farm.

Green-house Plants.—Special study of all plants grown in our green-houses and the shrubs, etc., on the lawn.

DEPARTMENT 3.—VETERINARY SCIENCE.

Materia Medica.—The preparation, actions, uses, and doses of medicines—continued from the spring term of the first year. Lectures on special subjects, such as pleuro-pneumonia, the rinderpest, tuberculosis, etc.

Veterinary Obstetrics.—Description of fœtal coverings. Pneumonia in connection with puberty, œsirom, gestation, sterility, abortion, normal and abnormal parturition. Diseases incidental to pregnant and parturient animals.

DEPARTMENT 4.—ENGLISH.

English Classics.—The critical study of Milton's "L'Allegro" and "Il Penseroso."

DEPARTMENT 5.—MATHEMATICS.

Surveying and Levelling.—Fields surveyed with chain and cross-staff ; measurements of heights.

Road-making.—Determination of proper slopes ; shape of road bed ; drainage of roads ; friction on different roads ; various road coverings ; the maintenance of roads ; cost, etc.

APPENDIX IV.

I. PAPERS SET AT EASTER EXAMINATIONS, 1891.

FIRST YEAR.

Agriculture.

I. Mention the strong and weak points of farm-yard manure.

II. What is meant by volatilisation as applied to farm-yard manure? What measures may be taken to prevent it?

III. Mention the different forms in which bones are applied as fertilisers, and the distinguishing features of each.

IV. Give the chief of the rules that govern the application of lime.

V. Mention the different soiling crops adapted to Ontario; conditions in the order in which they may be grown. Name four of these which you consider the most valuable.

VI. Indicate the method of procedure in soiling horses and in soiling milch cows.

VII. What is the usual method of classifying wheat, barley, and oats?

VIII. Describe the soils best adapted to the growth of rye, peas, and turnips?

IX. In what respects are the straw and grain of wheat affected by climate and soil?

X. Give in brief outline some facts relating to the origin of the oat, the latitudes where it may best be grown, and its susceptibility to improvement.

Inorganic Chemistry.

I. What is meant by the latent heat of water and the specific heat of sand? How were these proven in the laboratory?

II. Describe the making of hydrogen gas. State its properties. Give equation of formation. Sketch the apparatus.

III. Give the formulas and names of all the compounds of H. O. and N. with one another.

IV. Give names and formulas for five acids and the salts of the same with sodium, calcium and iron.

V. Explain the chemical changes taking place in the following:—the burning of limestone, the setting of plaster of Paris, the setting of mortar, the dissolving of limestone by soil water.

VI. Distinguish hard and soft water according to composition.

VI. What is the composition of the atmosphere? How do we prove that it is not a chemical compound?

VIII. A sample of mineral phosphate of lime contains forty per cent. of lime, how much oil of vitriol (80 per cent. pure) will be required to convert it into superphosphate?

IX. Name four elements having allotropic forms. State the forms.

X. Distinguish sulphides from sulphates, chlorides from chlorates, hydrides from hydroxides.

Organic Chemistry.

I. Distinguish according to composition the hydrocarbons and the carbohydrates; name and give formulas for six of each and the sources from which the two classes are obtained.

II. What are the alcohols? Give formulas for wood-spirit and spirits of wine. How obtained? Give equations representing their change to acids.

III. Distinguish by example empirical, rational and graphic formulas.

IV. Define fermentation. Give four examples explaining change by chemical equations.

V. What are verdegris, sugar of lead, hard soap, soft soap, butyl alcohol, butyric acid?

VI. Give formula for butyrin and stearin.

VII. Classify the sugars according to nature and composition.

VIII. Classify the organic nitrogenous compounds of plants, giving examples.

IX. Show how methane can be changed to ethane, and common alcohol into common ether.

X. Define isomerism and give examples with graphic formulas.

Zoology.

I. Give the life history of a coral; the conditions necessary to its growth, and state how corals have exerted an influence in the formation of soil.

II. Explain the terms distribution in time and space, and give examples illustrating your answer.

III. Give a list embracing 15 of the most common insectivorous birds.

IV. Define parasitism, hybernation, mimicry and migration as illustrated in animal life. Give examples of each and name the sub-kingdoms to which they belong.

V. Distinguish between a whale and a shark, and compare the circulatory apparatus of a bird with that of a reptile.

VI. Name the classes into which the vertebrates are divided, and name the great points of distinction between man and the lower animals.

VII. Describe the formation of a pearl.

VIII. Identify the specimen before you.

Veterinary Anatomy.

I. Give the number of temporary and permanent teeth in the horse, ox and sheep.

II. Give the ages at which the temporary incisors make their appearance in the foal, and state the evidences afforded by the incisors of the ages of four, five and six in the horse.

III. Describe the pharynx.

IV. Describe the course of the œsophagus.

V. Name the divisions of the small intestine.

VI. Describe the bladder.

VII. Explain how respiration is accomplished.

VIII. Name the different kinds of blood vessels, and describe their coats.

IX. Describe the trachea, bronchi and bronchial tubes.

X. Give a description of the third compartment of the stomach of Ruminants, and state its functions.

English Grammar.

I. State precisely and illustrate by examples what is meant in grammar by part of speech, case, bare predicate, and verb of incomplete predication.

II. Give under separate heads short lists of certain classes of words, each of which performs at the same time the office of two parts of speech, and show by an example the use of one such word in each class.

III. Quote the rules for the use of the dash, the comma, the colon and the semicolon.

IV. Punctuate the following, giving reasons :

(1) Very well said Mr. Crumles bravo
Bravo cried Nicholas resolved to make the best of everything beautiful
This sir said Mr Vincent Crumles bringing the maiden forward
This is the infant phenomenon Miss Ninetta Crumles
Your daughter inquired Nicholas
My daughter my daughter replied Mr Crumles the idol of every place we go sir

(2) Can indicates possibility as I can read.

(3) The subject is treated under three heads as follows

V. Correct or improve the following sentences, giving the reason or reasons in each case :

(1) Not only should we consider the outside show but the foundations.

(2) "Play has its legitimate function in the life of man," says Holland.

(3) An unknown man, apparently about forty, suicided last evening by jumping into the river.

(4) They were real glad when they seen us.

(5) The druids of old offered sacrifices of men.

(6) Was you at the concert last night me and Jennie was there.

VI. Write a short letter to some friend or acquaintance, containing at least three paragraphs, stating how you have spent your time and what you have observed and learned since Christmas.

English Literature—Selections from Longfellow.

I. (*a*) Give a synopsis of the poem, "Robert of Sicily."

(*b*) What is the purpose of the poem, and where in the poem is that purpose expressed ?

II. The angel smiled, and from his radiant face
A holy light illumed all the place.
And through the open window, loud and clear,
They heard the monks chant in the chapel near,
Above the stir and tumult of the street ;
"He has put down the mighty from their seat,
And has exalted them of low degree !"

Parse *from*, line 1. *Loud*, 1 line 3.

Give meaning and derivation of *angel*, *chant*. Account for the letter *h* in chant.

Where is the quotation of the last two lines from ?

III. Quote the first stanza of "The Birds of Killingworth," and the stanza introducing the Preceptor ; and point out any rhetorical figures employed.

IV. In what way does Longfellow use the *Night* in these poems ?

V. Account for the popularity of the "Psalm of Life." Compare it with the "Hymn to the Night."

VI. In which of the Tales is there most pathos; in which most humor; in which most sublimity?

VII. Write *brief* notes on the following:—Sicily, St. Augustine, Danish King, "Cinque Ports."

VIII. In "The Day is Done," give in concise prose the contents of the lines commencing with Come read to me some poem ....to the end.

IX. Give a brief sketch of Longfellow's life, his chief poems and the characteristics of his poetry.

Arithmetic.

N. B.—Nos. 1, 2, 3, 4, 5, 6 for juniors; Nos. 5, 6, 7, 8, 9, for seniors.

I. A can plow 1 acre 25 square rods a day of 10 hours.

(*a*) How much can he plow in 15 days?

(*b*) How long will it take him to plow a field of 12½ acres!

II. Divide 1.39 by .013; multiply the quotient by 7.09; express the product as a vulgar fraction.

III. Estimate the profits from a 12-acre crop of two-rowed barley. State the details of cost, etc. Include in these the interest on the value of the land.

IV. You buy 12 cattle in the fall; fatten them during the winter, and sell in the spring. Estimate the profits. In supplying the necessary data give the average daily ration and increase, and thus make the calculation.

V. Compare the profits from a 12-acre crop of hay and a 12-acre crop of corn, with the following data:

Yield of hay—1 ton 18 cwt. to the acre, worth $9 a ton.

Yield of corn—16 tons to the acre. It shrinks 1-7 of its weight before it is put into the silo.

Two tons of ensilage equal in feeding value to one ton of hay.

VI. Find the difference between the simple and compound interest on $895 for 2 years, 9 months at 7 per cent.

VII. A sells produce to B on January 2nd, 1891, and takes B's note for the amount ($365) due four months hence. A gets this discounted February 21st at the Bank of Commerce at 7 per cent.

(*a*) Find the amount A receives from the bank.

(*b*) Find to 2 decimal places the rate per cent. of interest the banker receives.

VIII. An article in New York costs $65. There is a duty of 30 per cent.; the freight $4; the Guelph merchant's profit 25 per cent.

(*a*) Find the retail price in Guelph.

(*b*) If the duty were abolished, what rate per cent. of discount could the Guelph merchant allow off his present marked price, and make the same rate of profit on his outlay.

IX. A sends B cattle to the value of $1,000. B sells on a commission of 2 per cent. and invests proceeds in stock, charging 1 per cent. commission for buying. Find the total commission. (Both commissions deducted from the $1,000).

SECOND YEAR.

Agriculture.

I. Mention the principal points of difference between the Jersey and Guernsey breeds of cattle in regard to (1) form, (2) size, (3) utility.

II. Enumerate the leading characteristics of the black cattle of Wales.

III. Mention some of the ways in which the varieties of external characters manifest themselves in the domestic breeds of sheep. Name the principal breeds imported into America.

IV. What should be the aim of the breeder in wool production? Enumerate and describe the principal defects found in wool.

V. How would you proceed in removing the fleece from a sheep?

VI. Sketch the leading points in the history of Merino sheep.

VII. Compare the Oxford Downs and Shropshire Downs in regard to points.

VIII. Compare the Leicester, Cotswold and Lincoln breeds of sheep in regard to (1) size, (2) color, (3) general form, (4) wool, (5) adaptability to average arable soils, and (6) early maturing properties.

IX. Name the two foreign breeds of swine used in improving the old English races, and describe them.

Practical Cattle.

I. Give your opinion of the Ayrshire cow Teena, viewed from the standpoint of the breed.

II. Give your opinion as to the value of the Shorthorn grade cow Speirs (1) for milk production, and (2) for producing cattle suitable for beefing purposes.

III. Compare the Shorthorn cow Maude and the Hereford cow Geranium with reference to beef production.

Practical Sheep.

I. Compare the two grade sheep E.T.N. 830 and E.T.N. 797, with reference to suitability for the production of mutton.

II. Point out the defects of the Cotswold ram E.T.N. 384, (1) as an individual, (2) as a Cotswold.

III. Show the strong and weak points of the Shropshire Down ewe E.T.N. 115, viewed from the standpoint of the breed.

Agricultural Chemistry.

I. Trace as fully as possible the formation of gluten back to its elementary constituents.

II. What is *Nitrification?* How is it influenced? What is its importance?

III. Give a list of the lime fertilisers. State their methods of application and their uses.

IV. Discuss the relationship between the constituents of crops as determined by analysis and their most suitable fertilisers.

V. State the place and the importance in a rotation of the following :—(*a*) bare fallow, (*b*) leguminous crops.

VI. Give formulas for three fats. How are they digested by the animal? How is the digestive co-efficient of fat in a fodder determined?

VII. Explain the following terms :—Non-protein, nutrient, nutritive ratio, N-free extract, ether extract, feeding standard.

VIII. Discuss the question as to the relationship of food to milk production.

IX. Wherein do the feeding values of the following consist:—Wheat bran, turnips, clover hay, linseed meal (O.P), whey, oats, corn ensilage, stover, corn meal, brewers' grains?

X. From what is the fat of the animal body formed? Cite authorities and experiments.

Economic Entomology.

I. In what respect does the classification of Comstock differ from that ordinarily adopted, and state what forms the basis of classification in insects?

II. Name the most important genera among beneficial insects in the orders Coleoptera and Hymenoptera, and the families to which they belong.

III. Give a coal oil and carbolic acid emulsion. State the precautions to be observed in making them and against what insects you would use them.

IV. Describe the appearance and the life history of the Carpocapsa pomonella.

V. Give remedies for the prevention of the ravages by the wire worm, cabbage worm, and oyster shell bark louse.

VI. Give the common and the scientific names of at least three insects injurious to wheat, six to the apple, two to the potato, and two to clover.

VII. Compare the Hessian fly with the wheat midge.

VIII. Identify the specimens before you and name the plants affected by them. Give one remedy for those numbered 1, 3, 5, 7.

Diseases of Domestic Animals.

I. Give the nature, causes, symptoms, and treatment of "Side Bones."

II. Explain as to whether Bog Spavin, Thoro' pin and Curb are hereditary or not.

III. Describe the nature, causes, symptoms, and treatment of "Capped Hock."

IV. Explain the errors commonly committed in connection with horse shoeing.

V. Give the different symptoms of corns and navicular diseases.

VI. Describe the causes and treatment of foul-in-the-foot of cattle and sheep, and state the differential systems between it and foot-rot in the latter animals.

VII. Explain the nature of melanotic tumors, and give the treatment for warts.

VIII. Give the symptoms of hoven and impaction of the rumen in cattle.

IX. Give the differential systems of acute indigestion and colic in horses.

X. Give the nature, symptoms, and treatment of strangles.

Practical Horse.

I. Explain the advantages, and disadvantages, of each of the different methods of administering medicines to horses.

II. How is the heat of the body produced, and how is the temperature kept within normal limits?

III. Describe the evidences of what is called *quality* in horse-flesh.

IV. Give the normal number of pulsations to the minute in the horse, ox, sheep and dog.

V. Give the symptoms of choking in the ox.

English Literature.—Shakespeare's Othello.

I. Enumerate the principal differences between prose and poetry.

II. Give the main divisions of poetry, and write an explanatory note on each.

III. State concisely the chief points of excellence in *Othello* as a work of dramatic art.

IV. Describe the three principal characters, illustrating your descriptions by suitable quotations or references.

V. Complete the following quotations:
(*a*) ....in faith, 'twas strange
(*b*) Reputation is an idle
(*c*) O thou invisible spirit of wine
(*d*) When devils will the blackest sins put on
(*e*) Good name in man and woman
(*f*) ....Trifles light as air
(*g*) ....O thou weed

VI. Locate the following passages:—
(1) ....she shunned
the wealthy curled darlings of our nation.
(2) She that was ever fair and never proud.
(3) O God, that men
Should put an enemy in their mouths to
steal away their brains.
(4) Othello's occupation's gone.
(5) The bawdy wind that kisses all it meets.
(6) Speak of me as I am; nothing extenuate,
Nor set down aught in malice.

VII. In what sense are the following words and expressions used in "Othello"? *Ancient, incontinently, blessed condition, forfend, qualification, rank garb, pottle, to manage—domestic quarrel, quillets, close delations.*

VIII. I prithee, do so.—
Something sure, of state,
Either from Venice or some unhatch'd practice
Made demonstrable here in Cyprus to him,
Hath puddled his clear spirit; and in such cases
Men's natures wrangle with inferior things,
Though great ones are their object. 'T is even so;
For let our finger ache, and it indues
Our other healthful members even to that sense
Of pain: nay, we must think men are not gods,
Nor of them look for such observancy
As fits the bridal. Beshrew me much, Emilia,
I was, unhandsome warrior as I am,
Arraigning his unkindness with my soul;
But now I find I had suborn'd the witness,
And he's indicted falsely.

(*a*) Explain the allusions and point out the figures in this passage.
(*b*) Write a paraphrase of the passage.

Political Economy.

I. Define the following terms:
Political Economy, Value, Productive Labor, Price, Rent, Credit.

II. What effect has *Credit* on *Price.* ?

III. "There can be no general rise of the *value* of commodities,
There may be a general rise of the *price* of commodities."
Explain.

IV. "Money may be said to have two chief functions." What?
What substance is the best to be used as money and why?

V. The exports and imports of a country (not taking into account capital loaned out of the country) tend to equality. Show this.

VI. Does *rent* affect the price of bread?

VII. *Taxation.* Under what division of political economy is it discussed? In what ways are taxes raised in England?

VIII. Name some of the systems of land tenure existing in Europe, and discuss peasant proprietorship.

IX. When wages of agricultural laborers increase, what causes come into operation to lower them?

X. The principal laws that govern values are called the laws of *supply* and *demand.* What are those laws? Show by a table and explain the table.

II. PAPERS SET AT THE MIDSUMMER EXAMINATIONS, 1891.

FIRST YEAR.

Agriculture.

I. How is the Canada thistle (*Circium arvense*) propagated? State the mode of cultivation to be adopted in destroying it by means of the bare fallow. Why is shallow plowing considered preferable for this purpose?

II. How are wild flax (*Camelina sativa*) and ragweed (*Ambrosia artemisiæfolia*) propagated? Give the best mode or modes of eradicating the latter.

III. Of what country is the potato a native? When was it taken to Europe and by whom? State the soils for which it is adapted.

IV. Outline the origin and development of the sugar beet industry. How are the varieties distinguished? What can be done by way of cultivation to increase the quantity of sugar?

V. Mention the uses for which Indian Corn is grown in Canada. To which soils is it adapted? What place may it occupy in the rotation? State considerations that should govern the distance in planting.

VI. Why is Alsike clover so named? Give notes relating to cultivation and handling it for seed

VII. State the grasses and clovers you would use in laying down a permanent pasture and the quantities per acre. Why are permanent pastures never likely to become a very important feature of Canadian agriculture?

VIII. Mention the other names by which tall oat grass (*Avena elator*) is known. State its leading characteristics. To which soils is it adapted?

Dairying.

I. What are the requisites of a good dairy farm?

II. Give a succession of soiling crops, and mention some advantages of the system.

III. Winter dairying—is it practicable in Ontario?

IV. Ensilage—discuss it under the following heads :

(*a*) Growing the corn.

(*b*) Filling the silo.

(*c*) The number of cows that can be fed from a silo 16x16x20.

V. What is the average composition of milk, butter, and cheese?

VI. Explain "Colostrum." "Fore Milk," "Stripping," "Period of Lactation," and state briefly wherein they differ.

VII. What methods of creaming are used? Explain the working of each, giving points of comparison to guide in choosing which method to adopt.

VIII. What are the ranges of temperature for churning? When would you use a high one and when a low?

IX. When should the churn be stopped? Give reasons.

X. Give a scale of points for judging butter.

Botany.

I. What is meant by inflorescence? Describe the different kinds of flower-clusters, giving an example of each.

II. Mention and explain the terms applied to the various modes of insertion of stamens.

III. Describe fully a leaf. Name some of the most common forms with examples.

IV. Give the characters of the orders compositæ and liliaceæ with examples of weeds and economic plants in each.

V. Name the different parts of a flower, and describe the use of each part. Draw a diagram showing a stamen and a pistil and the parts of each.

VI. How are plants nourished before and after appearing above ground? Give the different forms of taproot with examples, and describe the various modes in which biennials store up nourishment during their first season.

VII. Name the order to which the following plants belong: penny cress, ginseng, leek, catnip, strawberry, groundsel, burdock, false-flax, liver-leaf, tare, columbine, sage, chicory, apple, and turnip.

VIII. Analyse the plant before you.

Geology.

I. Name the different minerals containing lime found in rocks and the sources from which it has generally been derived. Explain fully the action of water upon limestone.

II. How would you distinguish a metamorphic from an igneous rock? Give localities where such are found.

III. Name the different kinds of mountains as regards origin, and describe the lava deposits of the Tertiary period.

IV. Describe the condition of animal and plant life in the Devonian times, and give some economic products found in these rocks.

V. Compare the deposits of the Cretaceous period in England with those in America.

VI. Give some facts from geology, illustrating the denudating effects of rivers. Upon what conditions will the results depend?

VII. How do you account for the deposits of clay and gravel as seen in many parts of Ontario?

Mention any striking difference between the soils of Ontario and those of the Southern States.

VIII. Draw a diagram showing the systems represented in Ontario and give a leading feature in each.

IX. Describe briefly a volcano, referring to its origin and the results produced in the vicinity.

Veterinary Materia Medica.

I. From what sources are medicines derived?

II. Explain how medicines are believed to establish their actions.

III. From the drugs we have studied, give as many examples as possible of those that act as purgatives, diuretics, tonics, stimulants, anæsthetics, and caustics.

IV. Under what circumstances should aloes be withheld?

V. Give a prescription for diarrhœa.

VI. What are the properties, actions, and uses of copper sulphate?

VII. Name the active principles of cinchona, belladonna, and aconite.

VIII. What is a stomachic? Give examples.

IX. Give the actions and uses of aconite.

X. How is lime water prepared, and what are its actions and uses?

Grammar and Composition.

I. Define *inflection.* What parts of speech are inflected in English and to what extent?

II. Give the classification and inflection of pronouns, naming all the pronouns you know in each class.

III. How is the plural of nouns formed in English?
Give the plural of the following:—Ox, sheep, wife, lady, axis, lava, analysis, radius, brother, clearness, Governor-General, and cannon.

IV. Distinguish the new and the old conjugation of verbs. Why are they so called? Illustrate by a simple example the tendency of the language in forming the past tense.
Give the principal parts in the following verbs: Seek, drive, lie, lay, cleave, fly, flow, flee, work, clothe, may, lead, road, blow, swim, are.
Form a simple a compound, and a complex sentence, using the past tense and past participle of *does*, *speaks*, *falls.*

V. What are the advantages of using the participial construction instead of a clause? What two dangers are to be avoided in the participial phrase?
Point out the error in each of the following sentences and re-write each correctly:
(*a*) I could count no less than eleven cows seated at my window.
(*b*) Hoping you will soon recover, believe me, yours truly.
(*c*) Arriving an hour late the best part of the procession was not seen.
(*d*) Finding the darkness which we dreaded coming on the lake was quickly crossed.

Literature—"The Lady of the Lake."

I. Tell very briefly the story of the poem.

II. Give in one, two, or three words the subject of each stanza of Canto II.

III. Describe the person and character of Roderick and of James Fitz-James as these are revealed in the different parts of the poem.

IV. Refer by page and lines to any three passages you prefer in the poem, and briefly indicate their poetic merits.

V. Paraphrase Canto V, Stanza XI.

VI. Locate and explain the meaning of the following:

(*a*) I am alone,—my bugle strain
May call some straggler of the train;
Or, fall the worst that may betide,
Ere now this falsion has been tried.

(*b*) I'll dream no more—by manly mind
Not even in sleep is will resigned.

(*c*) I touch the chords of joy, but low
And mournful answers notes of woe.

. . . .

. . . . . .

"But ah! dear lady, thus it sighed
The eve thy sainted mother died.

(*d*) While yet a child,—and children know,
Instinctive taught, the friend and foe—
I shuddered at his brow of gloom.

(*e*) Some feelings are to mortals given,
With less of earth in them than heaven.

(*f*) His scorn of wrong, his zeal for truth.

(*g*) But secret path marks secret foe.

(*h*) Thou many headed monster thing,
O who would wish to be thy king.

(*i*) "Down, down," cried Mar, "your lances down!
Bear back both friend and foe!"

(*j*) The monarch drank, that happy hour.
The sweetest, holiest draught of power—
When it can say, with godlike voice,
Arise, sad virtue, and rejoice.

Mensuration.

I. A section of land is $\frac{7}{8}$ miles square.
- (*a*) Find the number of acres in it.
- (*b*) Find the number of acres in the road 66 ft. wide that surrounds it.

II. A barn is built 130 ft. by 70 ft. With the same amount of wall, how much more floor room would there be (*a*) if the barn were square? (*b*) if it were round?

III. The diameter of a tank 12 ft. deep is 14 ft.
- (*a*) Find the contents.
- (*b*) Find the depth of rainfall required to fill it from the roof of a barn 130x70.

IV. Find the dimensions of a cellar that will hold 2,000 bushels of turnips.

V. A silo is 20 ft. by 22 ft. and 18 feet high.
- (*a*) How many tons of silage will it hold if one cubic foot weighs 45 lbs.?
- (*b*) Find the dimensions of a mow of hay that has equal feeding value, if there are 200 cubic feet in a ton of hay, and one ton of hay has feeding value equal to two tons of silage.

VI. The diameters of the ends of a log 15 feet long are 7 feet and $3\frac{1}{2}$ feet respectively. Find the volume of the stick that remains when the log is trimmed so that the ends are equilateral triangles.

Book-keeping.

I. State the objects of farm book-keeping. Having these objects in view, enumerate and classify the accounts you would open.

II. Make out and close yearly account with cows.

III. Explain the method of closing the ledger.

IV. What is a trial balance? How would you proceed to find the mistake if the trial balance shows there is error?

V. State fully and concisely how the various accounts are affected by the record of the following:

(*a*) Got horses shod, $1.75.

(*b*) A steer died.

(*c*) Bought of S. Jones a thorough-bred cow, $200, January 20th, giving $100 cash and my note, due 8 months hence, with interest at 6 per cent., for the balance.

(*d*) Sowed 20 bushels fall wheat worth $1.10 a bushel in field No. 1.

(*e*) Paid S. Black $50 for wages.

(*f*) Drew $25 from bank; the accrued interest on money deposited.

VI. Write the form of the promissory note given in the case of V. (*c*), and of the receipt in the case of V. (*e*).

SECOND YEAR.

Agriculture.

I. Which was the most famous sale of cattle ever held, viewed from the standpoint of prices paid? Show wherein Shorthorns in the past proved themselves more valuable for crossing purposes than any other breed of cattle. Mention the principal weaknesses of the breed. Mention some particulars relating to it.

II. In size, form, and shapes, wherein do the Holsteins differ from the Shorthorns? The Galloways from the Aberdeen-Angus? The Ayrshires from the Jerseys?

III. Of the four principal breeds of Scotch cattle, which are composite? State the reasons for your belief. Which are hornless? Have we any evidence that they were not so from first? If so, how then did they become hornless?

IV. Describe the horn of the Hereford; the skin of the Devon; the colour of the Sussex; the tail of the West Highlander; the neck of the Kerry; the band of the Dutch Belted Cattle; and the nose of the Swiss Brown.

V. Is there a decided preference for the mutton of certain breeds of sheep in Britain? If so, on what is this preference founded? If such a preference does exist, what can we in Canada do to profit by it?

VI. In breeding, what is meant by prepotency? When is it strong usually? Why may it not be determined positively except by actual test? How does it become potent for evil sometimes?

Live Stock and Arboriculture.

I. Which breeds of pigs were used in originating the Cheshire Swine? The Improved Large Yorkshire? The Middle Yorkshire? The Duroc Jersey?

II. State the distinctions in form and characteristics between the Suffolks as bred in England and the Suffolks as bred in America? What is the supposed origin of the Suffolks as bred in America?

III. Describe the head of the Poland China, the Tamworth, the Chester White, and the Improved Large Yorkshire.

IV. In feeding cattle for the block, state certain relations that are considered suitable during the finishing winter.

V. Mention some principles that should be observed in the selection of stock rams . of breeding ewes.

VI. State some principles that apply in fattening pigs. Mention your favorite ration for this purpose.

VII. What is the value of sweet whey as a food factor to be given to store pigs? How should it be fed?

VIII. State some principles that apply to the transplanting of forest trees.

IX. How would you plant trees on steep declivities? for purposes of ornament on arable farms? for purposes of shade on arable farms? Which kinds are suitable for the latter purpose? Would you plant evergreens in an arable field along any of its borders except as windbreaks?

X. What have you to say as to the kinds of trees that may and may not be chosen to plant as windbreaks? As to the width of those windbreaks? What strong objection may be offered to planting them along the front of a farm?

Dairying.

I. Would it be advisable for Ontario farmers generally to engage in dairying? Give reasons for your answer.

II. What are the requisites of a good dairyman?

III. Explain the escutcheon and state its value to the dairyman.

IV. State what influences other than food affect the quality of milk, and also the effect of food on milk production.

V. Give Stewart's rules for the guidance of the dairyman up to churning.

VI. Describe the Lactoscope, Lactometer, Lacto-butyrometer, and state wherein the Babcock method differs from the Beimling.

VII. Describe the "Cooley" process of creaming, and give a sketch of the one in the Experimental Dairy.

VIII. Give a definition of cream, and state whether you would treat it from the time it was skimmed until the butter was ready for market.

IX. State as many as you can of Stewart's "Hints to the Cheesemaker," and give a scale of points for judging cheese.

Dairying (special paper).

I. What are the principal difficulties met with in milking and handling milk, and how may they be overcome?

II. Explain ripening of cream and its importance in the dairy.

III. Mention any experiments showing the proportion of gain in the various constituents of the corn plant between the stages of blooming and maturity.

IV. Explain secretion of milk, giving an outline of the theories put forth in explanation of the process.

V. In what proportion are the chief butter fats found in summer and winter butter respectively?

Botany.

I. Describe fully, 1, the plant in vegetation ; 2, the plant in reproduction.

II. Give the characters of the orders Scrophulariaceæ, Boraginaceæ and Gramineæ, naming four plants in each.

III. Name weeds which are just beginning to appear at the present time and the orders to which they belong.

IV. Describe the "ginseng," and give the characters of the poison ivy.

V. Compare the life history of smut with that of rust, and state why one is more readily remedied than the other?

VI. Give diagrams illustrating the form of stomata, pitted tissue, starch grains, the sporangium of the fern, and crystals in plants. How would you obtain specimens to examine these structures under the microscope?

VII. Explain the terms assimilation and absorption as applied to plants, and state how a plant is affected by frost.

VIII. Describe a seed and the changes which take place in germination. Compare the essentials for growth with those for germination and account for the difference.

IX. Identify the plant before you.

X. Contrast the Fungi with Exogens, as regards germination, vegetation and reproduction.

Practical Horticulture.

I Give notes on the appearance of the shrubs and trees upon the lawn up to the present, with reference to foliage, flower and hardiness.

II. Draw a diagram indicating the location of two clumps of shrubs belonging to the orders Saxifragaceæ and Rosaceæ.

III. Identify the plant before you.

IV. Assume you have a rectangular bed with a fence at the back; this is to be planted with flowers, twelve varieties. Indicate how you would arrange them.

V. Lay out a farmer's garden containing half an acre of land, keeping in view economy of labor and utility of plants grown.

Breeds of Horses and Obstetrics.

I. Give what are generally recognised as the strong and weak points of the Clyde and Shire respectively.

II. Give the characteristic of the Suffolk Punch.

III. What are the theories with regard to the origin of the Percheron?

IV. What qualities would the American trotter, Cleveland Bay, Hackney, and Thoro'-bred be likely to transmit to their progeny, respectively, when crossed with our light mares? Give your opinion with regard to the stamp of mare most suitable to cross with each of these breeds, in order to produce high class light horses.

V. Name the fœtal envelopes, and give the functions of the liquor amuii.

VI. Describe the graafion vesicle and its contents, and give their functions.

VII. Givo directions for applying traction in aiding delivery.

VIII What are the conditions in which division of the trunk is necessary? Explain how to accomplish it.

IX. Explain how to perform amputation of the fore leg of a fœtus.

X. Explain how to proceed to effect delivery in the following presentations, viz.: Anterior presentation, deviation of head towards breast, forelegs bent at knees, hocks presented.

English Literature—" L'Allegro and Penseroso."

I. Quote the descriptions, in the two poems, of rural life; and point out any instances in them where Milton's defective sight and studious habits have made his pictures untrue to nature.

II. Indicate by means of quotations and otherwise the harmony of time and scenery with the characters of L'Allegro and Il Penseroso.

III. Quote the references to Orpheus and the Drama. Are they appropriate? Give reasons for your answer.

IV. At what time of life did Milton write these poems? Which more truly reflects his own disposition? Give reasons.

V. (*a*) " Sometimes walking *not unseen*
By hedge-row elms on hillocks green."

(*b*) " And missing thee I walk *unseen*
On the dry smooth shaven green."

To whom does unseen apply in either case? Why is "not" present in the first extract and absent in the second? Explain where each speaker is walking.

VI. Explain the following:

(1) " While yet there was no fear of Jove."

(2) " Where I may outwatch the Bear
With thrice great Hermes, or unsphere
The spirit of Plato to unfold," etc.

(3) " Till old experience do attain
To something like prophetic strain."

(4) " The mountain nymph, sweet Liberty."

(5) " Russet lawns and fallows gray."

Roadmaking and Levelling.

I. Write a careful essay on the benefits to be derived from improving our country roads.

II. State concisely in the order of importance what you consider the four most important general principles to be observed in road-making.

III. Give full directions for the making of gravel roads.

IV. State briefly the present state of the laws relating to statute labor, and discuss the advisability of substituting direct taxation for statute labor.

V. Complete the following field-book. Determine the relative heights of A and E. Between which two points is the grade steepest? Sketch the line.

Stations.	Distance.	Backsight.	Foresight.	Ascent.	Descent.	Total height.
A						
B	130	5.45	3.20			
C	85	1.50	6.75			
D	70	6.35	2.80			
E	160	8.64	1.24			
F	145	4.45	4.86			
G	48	1.45	4.95			

Mechanical Department.—Practical.

Directions for making sign board for experimental field to be in all conditions like the pattern shown, *i. e.*, pillar 2 inches square by 5 feet long ; and board to be 1x12x16 feet long.

I. For pillar shoot off one edge of the 2-inch plank, first with the jack plane, and follow with the try plane and finish with the smoothing plane (set fine) ; the shot edge must be square with the face.

II. Gauge work from edge 2 inches wide and rip off; then with the bench planes in the regular order try up the other three sides. When finished the piece must be square-sided.

II. Point the pillar-like pattern, first with ripping saw take off the cheeks and finish with plane.

IV. For board see that the end is square with the edge and mark 16 feet long, cut square across, and with the bench planes in proper order plane off both sides and also edges and ends. All arises must be neatly taken off.

V. Fix board on pillar 1 inch from top end, using three 2-inch screws, having the heads sunk flush with face of board.

Mechanical Department.

I. There are three rules or tables on the steel square. State their uses and give an example of each respectively.

II. For a hip roof there are seven angles required, viz.:, plumb and level cut of common rafter, the plumb and level cut of hip, side cut of hip and the backing of hip, plumb and level cut of jack, side cut of jack. Give the application of the steel square to obtain the respective angles of a third pitch roof.

III. Give the number of bench tools which constitute a set and state the same in their working order, and give the grinding angle of plane irons.

IV. Give some of the points which distinguish between a ripping saw and one for cross-cutting.

APPENDIX V.

CLASS LISTS—EASTER EXAMINATIONS, 1891.

FIRST YEAR

AGRICULTURE.

CLASS I.

1 Shaw, R. S.
2 Harcourt, R.
3 Wiancko, A. S.
4 Dyer.
5 Beckett, H. L.
6 Hunter, H. A.
Curzon, S.

CLASS II.

1 Crealy, J. E.
2 Graham, W. R.
3 Bell, L. G.
4 Eaton, L. W.
5 Husband, E. M.
6 Brown, B. C.
7 Tolton, J. E.
8 Honsberger, J. D.
9 Brown, W. J.
10 Aylesworth, D.
Hurly, T. J.

CLASS III.

1 Carlaw, W.
Harvey, T. B.
Harvey, W. H.
4 Cooper, W. W.
Kent, A. S.
Ruthven, W. A.
7 McLean, R. R.
Silverthorn, C.
6 Conn, J.
10 Gies, N.
11 Thomas, B. C.
Yuill, A. R.
13 Carpenter, F. C. S.
14 Miller, C. W.
15 Freeman, G. M.
16 Doherty, G. F.
17 Curzon, A.
18 Bealey, H. B.
19 Copeland, B. M.
20 Bryson, F.
21 Nunn, H.

Counsell, W. N.
Adams, M. P.
Jackson, T. M.
Wait, J. W.
Aveline, F.

INORGANIC CHEMISTRY.

CLASS I.

1 Crealy.
2 Dyer.
Shaw.
4 Beckett.
5 Bell.

CLASS II.

1 Harcourt.
2 Wiancko.
3 Gies.
4 Eaton.

CLASS III.

1 Harvey, W. H.
2 Curzon, S.
3 Hurley.
4 Husband.
5 Ruthven.
6 Harvey, T. B.
7 Hunter.
8 Carpenter.
Honsberger.
10 Aylesworth.
Silverthorn.
12 Brown, B. C.
13 Conn.
14 Carlaw.
15 Cooper.
16 Graham.
17 Miller.
18 Copeland.
19 Kent.
20 Curzon, A.
21 Tolton.
22 Brown, W. J.
23 Yuill.

Bealey.
Thomas.
Bryson.
Doherty.
McLean.
Wait.
Aveline.
Jackson.
Nunn.
Freeman.
Counsell.
Adams, M. P.

ORGANIC CHEMISTRY.

CLASS I.

1 Shaw.
2 Bell.
Dyer.
4 Crealy.
5 Beckett.
Harcourt.
7 Wiancko.

CLASS II.

1 Hurley.
2 Gies.
3 Curzon, S.
Husband.
5 Harvey, T. B.
9 Harvey, W. H.
7 Silverthorn.

CLASS III.

1 Aylesworth.
Carpenter.
3 Hunter.
4 Ruthven.
5 Eaton.
6 Miller.
7 Curzon, A.
8 Cooper.
9 Copeland.
10 Tolton.
11 Carlaw.
12 Conn.
13 McLean.
Kent.
Honsberger.
Graham.

Thomas.
Brown, B. C.
Yuill.
Brown, W. J.
Freeman.
Doherty.
Bealey.
Bryson.
Wait.
Nunn.
Adams, M. P.
Aveline.
Counsell.
Jackson.

ZOOLOGY.

CLASS I.

1 Bell.
2 Crealy.
3 Beckett.
4 Harcourt.
5 Curzon, S.
6 Ruthven.

CLASS II.

1 Carpenter.
2 Hunter.
Wiancko.
4 Kent.
5 Silverthorn.
6 Husband.
Honsberger.
8 Cooper.
9 Thomas.
10 Brown, B. C.
11 Eaton.
12 McLean.
13 Dyer.
Harvey, T. B.

CLASS III.

1 Bryson.
2 Hurley.
3 Doherty.
4 Miller.
5 Harvey, W. H.
Brown, W. J.
7 Freeman.
8 Curzon, A.
9 Tolton.
10 Aylesworth.
Gies.
12 Bealey.
13 Carlaw.
14 Conn.
15 Copeland.
16 Yuill.
17 Graham.
18 Aveline.
19 Jackson.

Adams, M. P.
Nunn.
Wait.
Counsell.

NOTE.—Names unnumbered in the lists are those of students who failed to pass in the subject. The minimum for first class (honors) is 75 per cent.; for second class (honors) 60 per cent.; for third class (pass) 33 per cent.

Class Lists (Easter Examinations).—*Continued.*

FIRST YEAR.

Veterinary Anatomy.

Class I.

1 Shaw.
2 Bell.
3 Dyer.
4 Harcourt.
5 Crealy.
5 Beckett.

Class II.

1 Curzon, S.
2 Wiancko.
3 Husband.
4 Cooper.
5 Ruthven.
6 Brown, B. C.
Silverthorn.
8 Graham.
Hurley.

Class III.

1 Hunter.
2 Gies.
3 Harvey, W. H.
4 Harvey, T. B.
5 Aylesworth.
6 Miller.
7 Eaton.
8 Doherty.
9 Kent.
10 Tolton.
Carpenter.
12 Curzon, A.
13 Honsberger.
14 Jackson.
15 McLean.
Thomas.
17 Carlaw.
18 Conn.
Bryson.
20 Nunn.
21 Yuill.
22 Brown, W. J.
Copeland.

Freeman.
Bealey.
Aveline.
Adams.
Wait.
Counsell.

Grammar.

Class I.

1 Bell.
2 Shaw.
Harvey, T. B.
4 Crealy.
5 Curzon, S.
6 Dyer.
7 Carpenter.

Class II.

1 Harvey, W. H.
2 Husband.
3 Harcourt.
4 Conn.
Thomas.
6 Brown, W. J.
7 Aylesworth.
McLean.
Miller.
10 Eaton.
Wiancko.
12 Silverthorn.
13 Hurley.
14 Curzon, A.

Class III.

1 Bryson.
2 Graham.
3 Beckett.
4 Hunter.
5 Honsberger.
6 Brown, B. C.
7 Cooper.
Copeland.
Gies.
10 Carlaw.
11 Freeman.
Tolton.
13 Ruthven.
14 Doherty.
Yuill.
16 Nunn.
17 Bealey.
18 Kent.

Jackson.
Aveline.
Adams, M. P.
Wait.
Counsell.

English Literature.

Class I.

1 Bell.
2 Shaw.
3 Silverthorn.
4 Carpenter.
Harvey, W. H.
6 Crealy.
Beckett.

Class II.

1 Husband.
2 Harcourt.
3 Bryson.
4 Cooper.
5 Wiancko.

Class III.

1 Brown, W. J.
1 Miller.
3 Dyer.
4 Conn.
Hurley.
6 Hunter.
7 Curzon, S.
8 Thomas.
Brown, B. C.
10 Gies.
Ruthven.
12 Kent.
13 Carlaw.
14 Doherty.
15 Tolton.
Copeland.
Honsberger.
18 Eaton.
19 Aylesworth.
20 Graham.
Harvey, T. B.
22 Curzon, A.
McLean.
24 Yuill.
Freeman.
Bealey.

Nunn.
Wait.
Aveline.
Jackson.
Adams, M. P.
Counsell.

Arithmetic.

Class I.

1 Dyer.
2 Graham.
3 Harvey, T. B.
Shaw.
5 Beckett.
6 Kent.
7 Crealy.
8 Gies.
9 Harcourt.
10 Silverthorn.

Class II.

1 Miller.
2 Harvey, W. H.
3 Cooper.
4 Copeland.
5 Hunter.
6 Wiancko.
7 Eaton.
8 Bell.
Aylesworth.
Hurley.
Thomas.

Class III.

1 Husband.
2 Carlaw.
3 Conn.
Ruthven.
5 Yuill.
6 Honsberger.
7 Tolton.
8 Nunn.
9 Brown, W. J.
10 Carpenter.
11 McLean.
Curzon, S.
13 Brown, B. C.
Freeman.
Doherty.
Bealey.
Aveline.
Curzon, A.

Bryson.
Jackson.
Adams, M. P.
Wait.
Counsell.

General Proficiency.

Class I.

1. Shaw.
2 Crealy.
3 Bell.
4 Harcourt.
5 Dyer.
6 Beckett.

Class II.

1 Wiancko.
2 Husband.
3 Curzon, S.
Silverthorn.
5 Harvey, W. H.
6 Harvey, T. B.
7 Hunter.
1 Hurley.
2 Carpenter.
3 Eaton.
4 Gies.
5 Cooper.
6 Ruthven.
7 Miller.
8 Aylesworth.
9 Graham.
10 Kent.
11 Honsberger.
12 Conn.
13 Tolton.
14 Carlaw.
15 Copeland.
16 Curzon, A.

CLASS LISTS (EASTER EXAMINATIONS)—*Continued.*

SECOND YEAR.

AGRICULTURE.	PRACTICAL CATTLE.	PRACTICAL SHEEP.	AGRICULTURAL CHEMISTRY.	ENTOMOLOGY.
CLASS I.	CLASS I.	CLASS I.	CLASS I.	CLASS I.
1 Gibson, D. Z.	1 McKenzie.	1 Morgan.	1 Wilkin.	1 Gibson.
2 Carlyle, W. L.	2 Morgan.	2 Gibson.		2 Morgan.
3 Morgan, R. N.	3 Carlyle.	Carlyle.		3 Wilkin.
4 Wilkin, F. A.	4 Gibson.	4 McKenzie.		
5 Haight, W. L.	5 Hunter.	5 Thompson.		
	6 Thompson.	6 White.		
	7 Wilkin.	7 Haight.		
	Haight.	8 Marsh.		
	9 Marsh.	Hunter.		
	10 Perry.	Perry.		
	11 Moodie.			
	12 Sparrow.			
CLASS II.	CLASS II.	CLASS II.	CLASS II.	CLASS II.
1 McKenzie, A. G.	1 Spencer.	1 Sparrow.	1 Morgan.	1 Carlyle.
2 Spencer, W. A.	2 White.	2 Moodie.	2 Harrison.	2 Marsh.
3 Newcomen, W. F.	3 Whitworth.	3 Wilkin.	3 Carlyle.	3 Harrison.
4 Thompson, R. A.	4 Newcomen.	4 Spencer.	4 McKenzie.	Newcomen.
5 Perry, C. E.		5 Harrison.	5 Marsh.	5 Haight.
6 Hunter, G. N.		6 Newcomen.	Gibson.	6 White.
7 White, E. F.			7 White.	7 McKenzie.
8 Marsh, G. F.			8 Newcomen.	
CLASS III.	CLASS III.	CLASS III.	CLASS III.	CLASS III.
1 Sparrow, J. C. H.	1 Harrison.	1 Murphy.	1 Haight.	1 Thompson.
2 Moodie, A.	2 Grey.	2 Whitworth.	2 Perry.	2 Perry.
3 Whitworth, E. J.	3 Murphy.	3 Heward.	3 Thompson	3 Spencer.
4 Harrison, F. C.	4 Heward.	4 Grey.	4 Spencer.	4 Sparrow.
5 Murphy, A. C.			5 Moodie.	5 Whitworth.
6 Heward, A. D.			6 Sparrow.	6 Hunter.
			Hunter.	7 Moodie.
Grey, F. W.			Whitworth.	
			Murphy.	Murphy.

SECOND YEAR.—*Continued.*

DISEASES OF THE DOMESTIC ANIMALS.	PRACTICAL HORSE.	ENGLISH LITERATURE.	POLITICAL ECONOMY.	PROFICIENCY.
CLASS I.	CLASS I.	CLASS I.	CLASS I.	CLASS I.
1 Gibson.	1 Carlyle.	1 Wilkin.	1 Wilkin.	1 Gibson.
2 Carlyle.	2 McKenzie.	2 Harrison.	2 McKenzie.	2 Carlyle.
3 Wilkin.	3 Gibson.	3 Morgan.	3 Carlyle.	3 Wilkin
	4 Wilkin.		Marsh.	4 Morgan.
			5 Gibson.	
CLASS II.	CLASS II.	CLASS II.	CLASS II.	CLASS II.
1 McKenzie.	1 Marsh.	1 Gibson.	1 Haight.	1 McKenzie.
	2 Morgan.	2 Carlyle.		2 Marsh.
	3 Thompson.	3 Newcomen.		3 Haight.
	4 Spencer.	4 McKenzie.		4 Newcomen.
CLASS III.	CLASS III.	CLASS III.	CLASS III.	CLASS III.
1 Morgan.	1 Haight.	1 Perry.	1 White.	1 White.
2 Spencer.	2 Sparrow.	2 Marsh.	2 Morgan.	2 Harrison.
3 Hunter.	3 White.	3 White.	3 Newcomen.	3 Thompson.
4 Newcomen.	4 Whitworth.	4 Thompson.	4 Spencer.	4 Perry.
5 Thompson.	5 Hunter.	5 Haight.	5 Harrison.	5 Sparrow.
6 White.	6 Newcomen.	6 Sparrow.	6 Thompson.	
7 Sparrow.	7 Grey.	7 Hunter.	7 Sparrow.	
8 Whitworth.	8 Moodie.		8 Perry.	
9 Harrison.	9 Harrison.		Hunter.	
10 Marsh.	10 Perry.		Murphy.	
11 Haight.	11 Murphy.	Moodie.		
12 Moodie.		Spencer.		
13 Perry.		Murphy.	Whitworth.	
Murphy.	Heward.	Whitworth.	Moodie.	
Heward				

CLASS LISTS (MIDSUMMER EXAMINATIONS, 1891.)

FIRST YEAR.

AGRICULTURE.

CLASS I.

1 Shaw, R. S.
2 Crealy, J. E.
3 Soule, A. M.
4 Bell, L G.
  Harcourt, R.
6 Harvey, T. B.
7 Dyer, W. D.

CLASS II.

1 Beckett, H. L.
2 Curzon, S.
3 Wiancko, A. T.
4 Story, H.
5 Hurley, T. J.
6 Harvey, W. H.
7 Kent, A. L.
  Miller, C. W.
9 Thomas, B. C.

CLASS III.

1 Brown, B. C.
  Cooper, W. W.
3 Graham, W. R.
4 Ruthven, W. A.
  Yuill, A. R.
6 Brown, W. J.
7 Connor, J.
  Eaton, L. W.
  Carpenter, F.C.S
10 Gies, N.
11 Freeman, G. M.
12 Honsberger, J.D.
13 Aylesworth, D.
14 Tolton, J. E.
15 Silverthorn, C.
16 Curzon, A.
17 Doherty, G. F.
18 Carlaw, W.
19 Bryson, F.
20 Bealey, H. B.
21 Nunn, H.
  Wait, J. W.

Jackson, T. M.
Aveline, R.
Counsell, N. W.

DAIRYING.

CLASS I.

1 Crealy.
2 Harcourt.
3 Shaw.
4 Aylesworth.
  Beckett.
6 Dyer.

CLASS II.

1 Eaton.
2 Gies.
3 Soule.
4 Carlaw.
  Silverthorn.
6 Cooper.
  Harvey, T. B.
  Honsberger.
  Thomas.
10 Harvey, W. H.
  Ruthven.
12 Bell.
13 Wiancko.
  Miller.
15 Brown, W. J.

CLASS III.

1 Graham.
  Kent.
  Yuill.
4 Hurley.
5 Curzon, S.
6 Brown, B. C.
7 Story.
8 Tolton.
9 Carpenter.
10 Conn.
11 Doherty.
12 Curzon, A.
  Freeman.
14 Bryson.
  Bealey.

Jackson.
Aveline.
Wait.
Counsell.

BOTANY.

CLASS I.

1 Shaw.
2 Crealy.
3 Beckett.
  Soule.
5 Bell.
6 Harcourt.
7 Dyer.
8 Curson, S.

CLASS II.

1 Wyancko.
2 Story.
3 Curzon, A.
4 Cooper.
5 Hurley.

CLASS III.

1 Eaton.
2 Carlaw.
3 Miller.
4 Graham.
5 Carpenter.
6 Gies.
  Ruthven.
8 Harvey, W. H.
9 Kent.
  Silverthorn.
11 Tolton.
12 Honsberger.
13 Aylesworth.
14 Bryson.
  Brown, B. C.
16 Brown, W. J.
17 Harvey, T. B.
18 Thomas.
19 Bealey.
20 Conn.
21 Yuill.

Freeman.
Doherty.
Wait.
Jackson.
Counsell.
Aveline.
Nunn.

GEOLOGY.

CLASS I.

1 Shaw.
2 Bell.
3 Soule.
4 Crealy.
5 Beckett.
6 Dyer.
  Harcourt.
8 Wiancko.

CLASS II.

1 Carpenter.
2 Ruthven.
3 Curzon, S.
4 Hurley.
5 Aylesworth.
6 Brown, W. J.
7 Harvey, W. H.

CLASS III.

1 Miller.
2 Curzon, A.
3 Story.
4 Gies.
5 Eaton.
6 Graham.
7 Silverthorn.
8 Cooper.
9 Brown, B. C.
10 Carlaw.
  Yuill.
12 Tolton.
13 Thomas.
  Honsberger.
15 Conn.
16 Harvey, T. B.
17 Doherty.
  Kent.
19 Bryson.
20 Freeman.

Jackson.
Wait.
Nunn.
Bealey.
Aveline.
Counsell.

MATERIA MEDICA.

CLASS I.

1 Crealy.
2 Shaw.
3 Wiancko.
4 Ruthven.
  Harcourt.
6 Dyer.

CLASS II.

1 Beckett.
2 Eaton.
  Hurley.
4 Bell.
  Curzon, S.
6 Harvey, W. H.

CLASS III.

1 Gies.
2 Soule.
3 Miller.
4 Honsberger.
5 Cooper.
6 Silverthorn.
  Brown, B. C.
8 Graham.
9 Kent.
10 Carlaw.
  Curzon, A.
12 Conn.
  Aylesworth.
14 Story.
15 Tolton.
16 Carpenter.
17 Yuill.
18 Bryson.
19 Harvey, T. B.
20 Doherty.

Thomas.
Brown, W. J.
Bealey.
Freeman.
Aveline.
Wait.
Jackson.
Counsell.

CLASS LISTS (MIDSUMMER EXAMINATIONS)—*Continued.*

FIRST YEAR.

LITERATURE.

CLASS I.

1 Bell.
2 Beckett.
Soule.
4 Shaw.
5 Harvey, W. H.
Crealy.

CLASS II.

1 Harcourt.
2 Dyer.
3 Carpenter.
4 Hurley.
5 Curzon, S.
6 Story.
7 Silverthorn.
Honsberger.
9 Harvey, T. B.
10 Miller.

CLASS III.

1 Aylesworth.
2 Brown, W. J.
3 Bryson.
4 Wiancko.
5 Graham.
6 Thomas.
7 Tolton.
8 Ruthven.
9 Brown, B. C.
10 Carlaw.
11 Freeman.
Kent.
13 Gies.
Conn.
15 Curzon, A.
Yuill.
17 Eaton.
18 Bealey.
19 Doherty.

Cooper.
Aveline.
Jackson.
Counsell.
Wait.

GRAMMAR.

CLASS I.

1 Dyer.
2 Harcourt.
3 Beckett.
4 Harvey, W. H.
5 Bell.
6 Crealy.
7 Shaw.
Eaton.
Curzon, S.

CLASS II.

1 Hurley.
2 Conn.
3 Miller.
4 Wiancko.
5 Carpenter.
6 Thomas.
Honsberger.

CLASS III.

1 Cooper.
2 Graham.
3 Silverthorn.
4 Aylesworth.
5 Ruthven.
6 Harvey, T. B.
7 Soule.
Story.
9 Brown, W. J.
10 Gies.
11 Tolton.
12 Curzon, A.
13 Carlaw.
14 Brown, B. C.
15 Yuill.
16 Kent.
17 Freeman.
18 Bealey.

Bryson.
Doherty.
Aveline.
Jackson.
Wait.
Counsell.

MENSURATION.

CLASS I.

1 Shaw.
Dyer.
3 Beckett.
4 Harcourt.
5 Harvey, W. H.
Story.
7 Harvey, T. B.
8 Gies.
9 Graham.
10 Crealy.
Soule.
12 Hurley.
Bell

CLASS II.

1 Kent.
2 Honsberger.
Cooper.
4 Miller.
5 Silverthorn.
6 Tolton.
7 Aylesworth.
8 Wiancko.
9 Curzon, S.

CLASS III.

1 Brown, W. J.
2 Yuill.
3 Ruthven.
4 Eaton.
5 Carlaw.
6 Conn.
7 Carpenter.
8 Freeman.
9 Brown, B. C.
10 Thomas.
11 Doherty.

Nunn.
Bealey.
Curzon, A.
Aveline.
Bryson.
Wait.
Counsell.
Jackson.

BOOK-KEEPING.

CLASS I.

1 Beckett.
2 Hurley.
3 Crealy.
Shaw.
5 Bell.
6 Harvey, W. H.
7 Soule.
8 Dyer.
9 Wiancko.
Story.

CLASS II.

1 Harcourt.
2 Harvey, T. B
3 Ruthven.
4 Graham.

CLASS III.

1 Honsberger.
2 Eaton.
3 Silverthorn.
4 Carpenter.
5 Cooper.
6 Thomas.
7 Gies.
8 Tolton.
9 Brown, B. C.
10 Conn.
11 Miller.
12 Freeman.
13 Aylesworth.
14 Carlaw.
15 Yuill.
16 Brown, W. J.
17 Kent.
Curzon, A.

Curzon, S.
Bealey.
Wait.
Bryson.
Doherty.
Jackson.
Counsell.
Aveline.

GENERAL PROFICIENCY.

1 Shaw.
2 Crealy.
3 Beckett.
4 Harcourt.
5 Dyer.
6 Bell.
7 Soule.
8 Hurley.
9 Harvey, W. H.
10 Wiancko.
11 Story.
12 Ruthven.
13 Harvey, T. B.
14 Miller
15 Eaton.
16 Graham.
17 Honsberger.
18 Carpenter.
Aylesworth.
20 Gies.
Silverthorn.
22 Kent.
Tolton.
24 Carlaw.
25 Conn.
26 Brown, B. C.
27 Yuill.

CLASS LISTS (MIDSUMMER EXAMINATIONS)—*Continued.*

SECOND YEAR.

LIVE STOCK AND ARBORICULTURE.	DAIRYING.	ANALYTICAL CHEMISTRY.	BOTANY.	PRACTICAL HORTICULTURE.
CLASS I.	CLASS I.	CLASS I.	CLASS I.	
1 Carlyle, W. L. 2 Gibson, D. Z. 3 Morgan, R. M. 4 Wilkin, F. A.	1 Carlyle. 2 Gibson. 3 Morgan.	1 Gibson. Harrison. Wilkins. 4 Morgan. Carlyle. Spencer. 7 Newcomen. 8 Thompson.	1 Gibson 2 Morgan. 3 Wilkin. 4 Carlyle.	
CLASS II.	CLASS II.	CLASS II.	CLASS II.	CLASS II.
1 Thompson, R. A. 2 Haight, W. L. 3 Marsh, G. F.	1 Wilkin. 2 Harrison. 3 Haight. 4 McKenzie.	1 Haight. Marsh. Sparrow. White.	1 Haight. 2 White. Newcomen. 4 Sparrow. 5 Harrison. 6 McKenzie.	1 Gibson. 2 Wilkin. 3 Morgan. 4 Carlyle.
CLASS III.	CLASS III.	CLASS III.	CLASS III.	CLASS III.
1 Harrison, F. C. 2 Sparrow, J. C. H. 3 White, E. F. 4 Spencer, W. A. 5 McKenzie, A. G. 6 Newcomen, W.F. 7 Perry, E. C. 8 Whitworth, E. J.	1 Perry. 2 Sparrow. 3 Thompson. 4 Spencer. 5 Marsh. 6 White. 7 Whitworth. 8 Newcomen.	1 Perry. 2 McKenzie. Murphy. Whitworth.	1 Marsh. 2 Thompson. 3 Spencer. 4 Whitworth. Perry. Murphy.	1 Haight. 2 White. 3 Marsh. 4 Thompson. Harrison. 6 Newcomen. 7 Sparrow. 8 Spencer. 9 McKenzie. 10 Perry. 11 Whitworth. Murphy.

SECOND YEAR—*Continued.*

BREEDS OF HORSES AND OBSTETRICS.	LITERATURE.	ROAD-MAKING AND LEVELLING.	GENERAL PROFICIENCY.
CLASS I.	CLASS I.	CLASS I.	
1 Carlyle. 2 Gibson. 3 Morgan.	1 Harrison. 2 Morgan. 3 Newcomen. 4 Carlyle.	1 Gibson. 2 Wilkin. 3 Morgan. 4 Harrison. Carlyle. 6 Marsh. 7 Haight.	1 Gibson. 2 Carlyle. 3 Morgan. 4 Wilkin. 5 Harrison. 6 Haight. 7 Newcomen. 8 Thompson. 9 Marsh. 10 Sparrow. 11 White. 12 Spencer. 13 McKenzie. 14 Perry.
CLASS II.	CLASS II.	CLASS II.	
1 Wilkin. 2 Harrison. 3 Haight. 4 Thompson.	1 Wilkin. 2 Gibson. 3 White. 4 Haight. 5 Sparrow. 6 Perry.	1 Newcomen. 2 White. 3 Spencer. Sparrow.	
CLASS III.	CLASS III.	CLASS III.	
1 McKenzie. 2 Marsh. 3 Sparrow. Newcomen. 5 Perry. 6 Whitworth. 7 White. 8 Spencer.	1 Marsh. 2 Spencer. 3 Thompson. 4 McKenzie.	1 Whitworth. 2 Thompson. 3 McKenzie. 4 Perry.	

(143
24 29 4

BINDING SECT. NOV 22 967

23975
Gov.Doc. Ontario. Legislativ
Ont Sessional papers
L Vol.24,pt.3 (1892)

DATE.